MANUAL

OF

BOTANY,

ADAPTED TO THE PRODUCTIONS

OF THE

SOUTHERN STATES.

IN TWO PARTS:

PART I.—VEGETABLE ANATOMY AND PHYSIOLOGY.

PART II.—DESCRIPTIVE BOTANY,

ARRANGED ON THE

NATURAL SYSTEM,

PRECEDED BY AN

ANALYSIS.

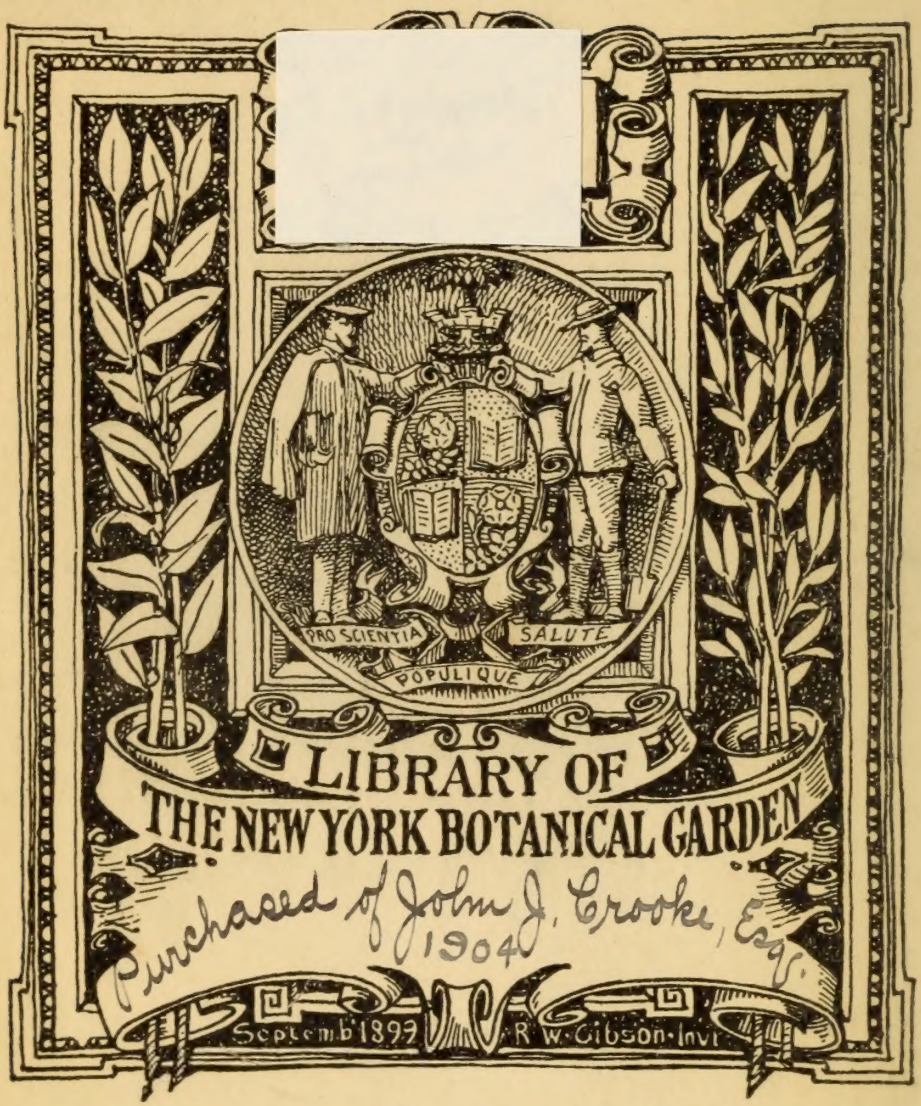
BY JOHN DARBY, A. M.

Professor of Chemistry and Natural Philosophy, in the Georgia Female College.

MACON:

PUBLISHED BY BENJAMIN F. GRIFFIN.

1841.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PREFACE.

No department of nature has higher claims on our attention, than the vegetable kingdom. It yields us the every-day necessaries of life. It affords us the indespensable articles for food, clothing, shelter and warmth; and without its constant ministrations, with our present constitution, existence would be impossible. But besides the benefits of which all are constant partakers, it lays other claims to our regard. The study and culture of the exquisitely beautiful objects which it presents, exert the happiest influence on all our social and moral feelings. So clearly has this been evinced to observation, that it has become a trite saying, that to the stranger, the flower pots in the cottage window of the poor, or about the dwellings of the wealthy, are almost sure indications of purity and social happiness within. On no page of creation, can be found more distinctly written, the wisdom, benevolence and love of the Creator, than on that which exhibits the structure and adaptation of organization to circumstances, of the humblest vegetable. The various beautiful provisions made for the protection of plants in winter; the storing up of food which may nourish plants or animals; the purification of the air by vegetable respiration, with innumerable other exhibitions of Divine wisdom and benevolence, are not only subjects fitted to call forth our admiration as intellectual beings, but *must* call forth the most devoted gratitude and love, from every heart not paralyzed in its workings, by unholy and groveling indulgences.

The vegetable kingdom is the laboratory in which Nature converts the inorganic elements into products fitted for sustaining animal existence, and it can but be a subject of prime importance to the welfare of man, that he understands the workings of the complicated apparatus she employs, that if possible, he may *aid* her efforts; and not, as is too often the case, *embarrass* her operations, by ignorance, when she is laboring for his good. To do this, he must study her products, determine by analysis the peculiar materials she may require for the production of the different kinds, and direct his operations accordingly. He must study the affinities of the different individuals, that he may appropriate to them their proper relations, in his arrangements. He must study their organization, that he may adopt with certainty such means of improvement as knowledge thus obtained may suggest. All this demands the attention of him who would reap all the blessings the existence of these beings was intended to confer.

The means of determining the names of the individual plants of the region in which we live, is certainly a prime step in our advancement to accomplishing any of the other objects proposed. The student of Southern Botany, is met in the very outset, by a want of such means, adapted to his necessities.

Smoke

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There is no work which can be introduced into our classes, in but a slight degree fitted for the student's use. The only works that have any claims on our attention for such a use, are Elliott's Sketches of the Botany of South Carolina and Georgia, and Eaton's Manual of Botany. The former of these works, is a noble monument to the genius, untiring labor and perseverance of its distinguished author; but it is not fitted for a text book in classes, as it contains no directions, analysis, or explanation of terms, which are indispensable accompaniments to elementary works. To the advanced student, this work, although having been published twenty years, is invaluable, and we are sorry to find that it is becoming so scarce. Eaton's Manual has been the means of much good, but on Southern plants, it is (as a Botanist recently expressed himself,) little better than a catalogue. The descriptions, brief, as they must be in an elementary work, are in very many cases, not characteristic of the plants described. In short, we have no work on Southern Botany, which occupies the place of Torrey's and Beck's Manuals of the Botany of the Northern and Middle States. Surrounded by such circumstances, and having a strong desire that the youth of this land of flowers, should become interested in a subject in every respect calculated to elevate, refine, and please, we appealed to persons abundantly qualified for the task, to supply this hiatus in elementary works. — We uniformly received unfavorable replies to our applications; some excusing themselves from pressure of other duties; others, from the perplexity of the task. All, however, were anxious that the work should be accomplished, and were willing to lend assistance.

Under such circumstances, although engaged in one of the most laborious, and perplexing employments, we undertook the preparation of the work ourselves; believing that an imperfect production would be better than none at all. How far we have succeeded in supplying the deficiency complained of, we leave for the public to decide.

That the work is imperfect, no one is more ready to assert, than the author is to allow. That it contains errors, is equally soon yielded; and none, but those who have learned it by experience, can be aware of the difficulty of arriving at perfect accuracy in such a production. Works that have passed through several editions, under the direct supervision of distinguished authors, are still blemished with errors. But with all its present faults, we believe it will be much better than any work extant, in the hands of the student of Southern Botany. We submit it to their use, being perfectly willing to abide by any decision that an enlightened public may pass concerning it. Should it issue from the press, and exhibit not the first living impulse, for the want of public favor, we shall conclude it deserves none, and shall solace ourselves with the reflection, that our aim was good, but we lacked the power to perform what our wishes prompted.

On the other hand, should it be received with indulgence, we pledge our constant labors to make it more worthy the approbation of the public for which it is intended.

But another point of prime importance in the study of Botany is, to group together those plants which are nearly allied by natural affinities. —

This, the Linnæan Artificial system does not do, and the two works alluded to are arranged by this system. The Natural System accomplishes this important end, and should therefore be substituted for the Artificial system, which is now so prevalent.

The Artificial System of Linnæus, operates by a constant violation of every principle of even a common sense arrangement, not to say of a strictly philosophical one. That Linnæus himself intended this arrangement as only a temporary one, is abundantly proved by his own expressions. "The artificial method," says he, "is but a substitute for the natural, to which it must in due time give place. The Natural Method is, and must be, the principal object of the science; the elucidation of which is the first and ultimate aim of Botanists." [*Gray's Botany, p.* 309.] It would be useless to add another remark to show the estimation in which Linnæus viewed his own system. And no one can imagine, that a Philosopher of Linnæus' sagacity, could ever have thought of fastening upon the world a system which violates every principle on which all other natural objects have been classed. As well might animals be classed by the number of their teeth, as plants by the number of their stamens; as well might birds and fishes be thrown into the same class, as grasses and forest trees. It is opposed, in fact, to our very idea of classification. Professor Lindley justly remarks, "No one has thought of first combining under the name of the animal kingdom, quadrupeds and birds, insects and fishes, reptiles and molusca, and then of subdividing them by the aid of a few arbitrary signs, in such a way that a portion of each should be found in every group — quadrupeds among birds and fishes, reptiles among insects and mammalia; but each great natural group has been confined within its proper limits. Botany alone, of all the branches of natural history, has been treated otherwise: and this in modern times."

The limits of this Preface forbid our entering upon the comparative merits of the two methods, but that the Natural System possesses almost infinite advantages over the Linnæan Artificial System, may be most easily demonstrated. That it offers fewer obstacles to the student in gaining a real knowledge of the name, nature, and constitution of vegetables, is acknowledged by all, who are acquainted with both. One great objection to the use of the Linnæan arrangement is, that students are led by the ease of taking the first step, to suppose that they are Botanists when that is taken, when in fact, they know nothing of the subject; and when the student meets with a difficulty, he must possess the most unwearied patience to surmount it, and when this is surmounted, it aids him but little in conquering future difficulties. The reverse is true of the Natural System; every step is a decided help in taking the next.

The principal facts connected with the structure and functions of the various vegetable organs, are given in the First Part of the work, and we trust they may be found useful to the practical agriculturalist, as well as to the student.

Another feature in this work, as at first intended, was to give the principles of every department of the science. But from our space being lim-

ited to a certain number of pages, and the Second Part occupying more of it than we had calculated, we have been compelled to leave out the Parts on Vegetable Products, and Vegetable Chemistry, although written, and prepared for the press. We regret this the more, as we deem Vegetable Chemistry one of the most interesting and important branches of science. We believe much more good may be done, by giving the outlines of a science in all its departments, in elementary works, than by treating them almost as independent sciences, and studying them at different times, and in connection with different subjects, as is uniformly the case with Vegetable Chemistry; this forming a part of a chemical course, which to a certain extent is proper, but never connected with the study of Botany, from which it ought never to be separated. Chemistry should always be considered in connection with this science, as a means by which we extend our botanical investigations, rather than a science including one of the most interesting departments of Botanical research. To be good Botanists, we need first to be good Chemists. To determine the name of a plant, although an absolutely necessary part to be attained, ought, by no means, to be the ultimate or chief aim of the student. He should only be satisfied when he is enabled to analyze a plant in all its relations; its products. its food, the soil in which it grows, and to examine and determine its constitution.

Our principal guide in the preparation of the *First Part*, has been Lindley's "Introduction to Botany." We have been aided, however, by Gray's "Elements of Botany," "Dutrochet's Memoirs on Animal and Vegetable Anatomy and Physiology;" Raspail's "Chemie Organique," and "Physiologie Vegetale;" Sir H. Davy's "Agricultural Chemistry;" Liebig's Organic Chemistry." Also, articles on Botany in the Edinburgh Encyclopædia and Library of Useful Knowledge, besides articles and Memoirs in the most distinguished French, English and American Scientific Journals.

In determining the plants of the *Second Part*, we have relied mostly on Elliott's "Sketches of the Botany of South Carolina and Georgia;" Nuttall's Genera of North American Plants;" Linnæus' "System of Nature;" Louden's "Encyclopædia of Plants;" article "Botany," Edinburgh Encyclopædia; De Candolle's "Prodromus," and Torrey and Gray's "Botany." as far as published. On several Orders and Genera, we have been aided by various monographs, as they have appeared in and journals pamphlets.

In the description of Orders, we have been as brief as possible, but aimed not to omit a characteristic, within the observation of the student, necessary to determining the order. For a text book for classes, it would have been nearly useless to insert characteristics which require the aid of good glasses to determine; and unless absolutely required, we have generally omitted such.

The Genera and Species, have been, in a great majority of cases, described from the plants themselves, and as much as possible, in their natural state. Under such circumstances, even in a brief description, we may identify the plant almost as accurately as in those more extended

INTRODUCTION.

That the Second Part may be understood by the beginner, and the method of using it made easy to him, we shall devote the Introduction to the Analysis of a few common plants, on which the student may practice, and by following a similar course with other plants, he may determine, in most cases, with little difficulty, their orders, genera and species.

All plants are arranged in two great divisions; *Flowering and Flowerless* plants; that is, such plants as produce flowers, constituting the first division, and such as produce no flowers, the second. Of the former, are all the most common and abundant vegetables; of the latter, Ferns, Mosses, Lichens, &c. These different divisions of vegetables, which are distinctly separated from each other by nature, have received different names from different Botanists, according to the point of distinction on which they founded their classification. The plants of the first division were called *Phenogamous*, by Linnæus, from having the organs of fructification visible. Those of the second, *Cryptogamous*, for the reason that the same organs were wanting, or inconspicuous. Jussieu called the plants belonging to the first division *Cotyledonous*, from the seed having cotyledons, and those of the second *Acotyledonous*, from the absence of these organs. Richard calls the first division *Endorhizæ*, from the circumstance that the seeds of these plants always contain a rudimentary root and stem, and the second *Exendorhizæ*, from the absence of an embryo.

De Candolle applies the terms *Vasculares* and *Cellulares* to the two great divisions, meaning by the former term, that the plants of the first division to which it is applied, contain a vascular system, with spiral vessels forming a part of it; and by the latter term, that the plants of the second division to which it is applied, have no such system, containing spiral vessels. Raspail makes quite a different division of plants; but, so far as we know, no Botanist has adopted his plan. He divides all plants into *Nocturnal*, or such as grow at night, or in the dark, and *Diurnal* or such as grow in the day.

Flowering plants are divided (as the student will see, by turning to the first page of the Analysis, at the beginning of the Second Part,) into two classes, the distinction depending on the manner of growth.

Class I. *Exogens*. A name given to this class from the fact that the stems of the plants of this division increase by external layers of new wood, as in our forest trees. The plants of this class may be readily known, by having a conical trunk, composed of *bark*, *wood* and *pith*; the wood arranged in concentric layers; leaves articulated with the stem, with the veins branching and reticulated. *Examples*. Trees, Shrubs, Beans, Potatoes, Pinks, Roses, &c.

CLASS II. *Endogens.* Including such plants as increase by the deposition of matter internally. Stem cylindrical, destitute of bark; wood not arranged in concentric layers; leaves not articulated with the stem; veins parallel, usually running from the base to the apex of the leaf. *Examples.* Corn, Grasses, Grains, Palmetto, &c.

The student will seldom find any difficulty in determining to which of the classes a plant belongs, although there are a few exceptions to the above descriptions. By observing the *Table* at the beginning of the Analysis, he will observe that the class Exogens is sub-divided into four *Sub-Classes*, in reference to the flowers.

Sub-Class 1. *Polypetalæ*—Corolla composed of several distinct pieces. Examples: Rose, Poppy, Violet, Apples, &c.

Sub-Class 2. *Monopetalæ*—Corolla consisting of one piece. Examples: Sage, Honeysuckle, Trumpet-flower, &c.

Sub-Class 3. *Apetalæ.*—Plants having a calyx, but no corolla. Examples: Maple, Sassafras, Nettle, &c.

Sub-Class 4. *Achlamydeæ.*—Flowers destitute of calyx or corolla.—Examples: Willow, Birch, Poplar, &c.

The Second Class, Endogens, is divided into two Sub-Classes.

Sub-Class 1. *Petaloideæ*:—Including such plants plants of this class as have regular petals; as the Lily, Orchis, Iris, Palmetto, &c.

Sub-Class 2. *Glumaceæ*—Flowers having glumes, instead of petals, which are arranged alternately, instead of in whorls, as in the Grasses, Grains, &c.

If the student should commence the study in early Spring, one of the plants with which he will be most likely to meet, is the Anemone, which he will readily distinguish by its delicate white flowers and compound leaves, and from its root bearing numerous small tubers. By an examination of the leaves, he finds that it belongs to the First Class, or Exogens, and from its several distinct petals, he determines that it belongs to the first Sub-Class, Polypetalæ; and by the numeral placed after this word, he will observe that the polypetalous orders commence on the first page of the Analysis. Under Polypetalæ, near the bottom of the page, he finds, "Section 1st. *Thalamifloræ*, meaning that the orders included in this section have the stamens hypogynous, or beneath the ovary or seed vessel.—The orders of this section are sub-divided into several groups, marked by *italics*. *a.* "Flowers perfect; stamens numerous; herbaceous plants." Our plant agrees with this description. First Order, *Ranunculaceæ*. In which he finds "Sepals 3 to 6, usually 5." This plant has no calyx. He therefore proceeds to the next order, and he finds "Calyx 2-leaved;" and so on through the several orders of this group, and all the plants have a calyx, but his has none.

Here, at the first setting out, he meets with a difficulty which may discourage his efforts, and induce him to lay aside his book; but with a little reflection and patience, he may, perhaps, surmount the difficulty. Perhaps the calyx is caducous, and has fallen off; he finds one not yet expanded, but no calyx is present. Either he has made some mistake at

starting, or there is some irregularity. He retraces his steps, and is sure his procedure has been correct. Let him begin again at *Ranunculaceæ*, and not regard the calyx. He then finds "Petals 2–15; carpels usually numerous." This he finds so, and the whole of Ranunculaceæ will correspond to this plant. He may therefore conclude that his plant belongs to this order; but of this he is not yet certain. Under *Ranunculaceæ*, he finds five sub-orders, and in the description of *Anemoneæ*, he finds that the flowers have no petals, but that the sepals or leaves of the calyx, are petaloid, or like petals; but the Achenia, or seeds, as he would call them, have appendages, or tails, but those of his plant have none.

The next two sub-orders have petals and sepals; his plant has but one kind of floral envelop. The fourth sub-order will be found to include the plant. By turning to the pages in the description of genera and species, indicated by the figures after the genera, under the sub-order *Cimicifugeæ*, he will find no difficulty in determining this plant to be the *Thalictrum Anemonoides*.

The student may ask, if the plant has no petals, why is it put among the Polypetalæ? And why is it not to be found among the Apetalæ?—The answer is, that it has nothing in common with any of the Apetalæ, but the absence of the petals, while it agrees in constitution in every other respect with the Ranunculaceæ. The more important points of agreement determine its position. The mere presence or absence of petals is of small moment compared with the general construction and properties of the plant. This example exhibits one of the worst cases with which the student will meet, and it is on this account that I have taken it, that he may know at the outset the nature of the difficulties he will have occasionally to encounter, and it will be only in the beginning of his course that such variations will embarrass him. Patience, perseverance and hard thought will accomplish all, and without them, little can be expected on any subject.

Another plant the student will be likely to find in blossom at this season, is the Dog-tooth Violet. By examining the leaves, he finds the veins running from the base to the apex; he at once concludes it belongs to the class Endogens. It has petals; it therefore belongs to the sub-class Petaloideæ, and by turning to page xvi. of the Analysis, he finds the orders of this sub-class divided into groups, according to the number of petals. The first group, marked A. is distinguished by the plants of this group having "Corrolla and Calyx distinct; Petals 3." In our specimen, there is no distinction of corolla and calyx, all the leaves composing the floral envelop having the same appearance, and in such cases the corolla and calyx are said to be confounded. We pass, then, to the group B., "Sepals and Petals confounded, usually 6, colored." This is the case with the plant we are analyzing. This group is sub-divided by arranging all the orders together, the plants of which have the perianth superior, marked *a.*; those in which it is inferior, marked *b.* Our plant plainly does not belong to the division *a.*, since

we shall readily perceive that the perianth has its origin below the seed vessel. We pass, then, to *b.*, on page xviii. With the first order of this group it does not agree, in not having a glumaceous perianth, or being "grass-like." With Melanthaceæ, in not having "3 styles." With Pontederæ, in not having a spathe. With Asphodeleae, in the form of the leaves and the testa of the seed. With Smilaceae, in the fruit not being baccate. The next order is Liliaceae, with which our plant will be found to agree. Under this order, there are three genera, and by noticing the figures after the first genus, Lilium, we turn to page 257, and by examining the plant in relation to Lilium, Yucca and Erythronium, we shall find no difficulty in determining our plant to be the *Erythonium Americanum.*

Let us now take an example which will bloom later in the season. The Primrose may be found every where, and is known to every body by its large, conspicuous, yellow flowers. The stem is about 12–18 inches high, with narrow and somewhat hairy leaves. We at once determine it to belong to the Class Exogens, from its leaves, and its having bark; and its four petals show it to belong to the sub-class Polypetalae. With Section I. under this sub-class, it plainly does not agree, since the stamens, so far from coming from below the ovary, are inserted into the top of the tube of the calyx, which is itself on the summit of the ovary. We pass, then, to Section II. page vi., *Calycifloræ.* "Stamens and petals perigynous;" that is, the stamens and petals have their origin from the calyx; this is so. Group A., "Calyx superior;" this is the case with our plant. This division is sub-divided, and distinguished by small *italic* letters. "*a.*, Stamens 5."—This is not so. The stamens are 8. We proceed to "*b.*, Stamens 8; Herbaceous plants." This is so; but it does not necessarily follow that this plant falls in this section, because it may belong to an order in which the stamens vary in number. We may soon determine by reading over *Melastomaceæ;* and we find that the plants of this order have opposite ribbed leaves, which our specimen has not. It is not a *Rhizophoraceæ*, for they are trees. It must, then, come in the division *c.* It is not in the order *Saxifragaceæ*, for the ovaria of this order have parietal placentæ, whereas the placentæ of our specimen are central. The next order is *Onagraceæ:* with this order it agrees. It also agrees with the first sub-order which contains the genera Epilobium. Œnothera, Gaura, Jussiæa, and Ludwigia, to one of which it must belong. We now notice that the first genus, Epilobium is described on page 89. We turn to this page, and by reading the description that the leaves are opposite; flowers purple; and that the plant grows among the mountains; all of which characteristics are obviously opposed by our specimen. With the Œnothera we find it agrees, and by applying the descriptions of the species to it, we shall find it to belong to the Œ. Linearis. Some of the species of this genus are found in blossom, from spring to autumn and are very common. For these reasons we have chosen this example.

As another example, let us take the Tread Softly, or Horse Nettle—a

very common plant, with prickly stems and leaves, and white or blue flowers. This we shall find, like the last example, to belong to Exogens; but when we come to the sub-class, we find the corolla to consist of a single piece, having the appearance of being formed of five petals united. This, then, belongs to *Monopetalæ*, the second sub-class. The orders of this sub-class, we find by the numerals after the word Monopetalæ, commence on page ix. of the Analysis. We turn to page ix., and find that the orders of this sub-class are divided into groups, according as they agree in certain obvious particulars. The first group is marked *a.*, the orders of which agree in having the ovary inferior; that is, below the calyx; and the corolla regular; that is, the border of the corolla is equally divided and equally expanded in all directions. The ovary of our plant is not inferior. We therefore proceed to *b*... the orders of which agree in having the ovary superior, corolla regular, and stamens 5. Our plant agrees with these particulars. It must therefore be found in this group of orders. We proceed then to apply the description of each order to our plant. With *Boragineæ* it does not agree in not having "4 distinct nuts," or "Flowers in secund spikes or racemes." With *Apocyneæ*, in not having folliculæ fruit; with *Plumbagineæ* in not having 5 stigmas or or a 10 toothed calyx. We thus proceed, and shall easily exclude it from all the orders, till we come to *Solaneæ*, with which we shall find it to agree. From the number following the first genus under this order, we find that the genera and species are described, commencing on page 230. We turn to that page, and find it to agree with the *Solanum*; and by applying the specific description, we shall determine that it is the *Solanum Carolinense*.

In the same manner may the majority of plants be analyzed; but the student must expect difficulties. These difficulties may arise from various causes; the variations of structure to which plants are liable; the difficulty in many cases of determining what the real structure is, without experience; and sometimes mistaking one organ for another. But by patient application these may be surmounted, and the gratification attendant on such conquests, will richly repay all the toil.

The student should not pass a term in the descriptions, that he does not understand, without looking for it in the Vocabulary, page 337, where he will find it defined, or the page referred to, in the text where it is described.

A very serious objection to the study of Botany, in the minds of many, is the *hard names*, as they are termed, with which the science abounds.—The same objection lies against every department of natural science, and this objection has its origin in the ignorance of the circumstances of the case. No one, certainly, will object to each object's having a name; this, *all* must admit is necessary. And all must allow, that in most cases the name is entirely arbitrary, and it matters but little what the name is by which a child, at least, is made to know an object. It will remember Ulmus, as well as Whahoo; Quercus Nigra, as well as Blackjack; Cornus Floridus, as well as Dogwood: Hepatica, as well as Liverwort; Datura Stramonium,

as well as Thornapple, or Jimpson weed. Now the first of these names is the one by which these plants are known all over the world by Botanists, and the latter is a provincial term, applied to them in this section only. In other sections of our own country, even, some of them are known by entirely different names; and the above common names are applied to entirely different plants. The Dogwood in New England, is the Acer Striatum, and what we call Dogwood here, is Boxwood there, and so of many others. — No one can fail to see at once, the utter confusion it would make, to attempt to apply the prevailing common names, in naming plants in Botany. And it is equally plain, that by introducing this study into our primary institutions of learning, that the time will soon come when there will be no difference in the Botanical and common names of plants.

But the technical terms used in the description of plants, are also objected to; but the reasons for their use, where any thing like accuracy is required, are, if possible, more absolute in requiring their continuance, than those for the uniform names of plants. The terms used are applicable to every department of science, as far as required, and are definite in their meaning, and are adopted in a greater or less degree in all countries and languages, where the sciences are cultivated.

The abbreviations used in this work, are only such as are common, with the exception of the following characters:

☉ Meaning that the plant is annual.
♂ " " biennial.
♃ " " perennial, herbaceous.
♄ " " shrubs or trees.

PART I.

VEGETABLE PHYSIOLOGY.

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1. Botany is that science, which treats of plants, and in its most extensive application makes us acquainted with the structure, vital action, classification, uses and distribution of vegetables.

2. A plant is an organized being, receiving its nourishment, which is always fluid, by absorption, generally through roots, and elaborating it by exposure to the combined action of air and light, on the surface of leaves or stem, and afterwards assimilating it to its own substance.

To the common observer it is not difficult to make a distinction, between a plant and an animal on the one hand, or a plant and a mineral on the other. But however unlike the three great kingdoms of nature, Animal, Vegetable and Mineral, may be, in their common forms, yet they approach each other by almost insensible gradations, and in certain objects it is difficult, for even the most accurate observer, to draw unerringly the line of demarcation. We see the Porifera* covering the rocks of the ocean, hanging in living festoons from the arches of caves, and clothing the otherwise naked cliffs, exposed to the alternate action of winds and waves, and firmly fixed to their several locations, and at the same time, perhaps, observe the floating Algæ, apparently destitute of roots, absorbing its nourishment through its whole surface, and in some degree endowed with the power of locomotion. In what respect does our definition exclude the porifera from the vegetable kingdom and embrace the Algæ in it? The manner in these cases in which the food is elaborated decides to which kingdom the individual belongs. The immoveable, and vegetable-like Porifera, has an internal organization,

* Sponges.

which prepares its food for nutrition, while the Algæ has no such apparatus, but does it by means of exposure on the stem. The distinction between the vegetable and mineral kingdoms, is generally more easily made, the transition is more apparent. Minerals are unorganized, and receive no nourishment, and of course destitute of the power of assimilation; but increase if at all by external layers. Yet there are substances which have been referred, at different times, both to the vegetable and mineral kingdoms, from the difficulty of determining to which they belong, which has been the case with some cryptogamæ.

3. The science of Botany is generally divided into several subjects for separate investigation:

1. *The structure of vegetables*, or *vegetable anatomy*, consisting of a description of the various vegetable tissues, and the organs which these tissues compose.

2. *Vegetable Physiology*, or that branch of the science, which has for its object the investigation of the functions of vegetable organs; or of all that belongs to vegetables as living beings.

3. *The examination of vegetable products*. First, as to their constitution forming vegetable chemistry. Second, as to materials administering to the wants of men and animals.

4. *Systematic Botany*, or the grouping together the various beings composing the vegetable kingdom, in a manner best suited for studying them, and at the same time affording a correct idea of the peculiar organization of an individual by the group in which it is included.

We shall not strictly adhere to the above divisions; but shall include, under one head, much that is properly included in the first two divisions, instead of following the more philosophical course above laid down. The interest of the student will not be sacrificed, but rather promoted by this course, as the knowledge of the constitution of an organ and its uses will be associated.

CHAPTER I.

ELEMENTARY ORGANS.

5. Vegetables are composed of solids and fluids. The solids are composed of an extremely delicate, elementary, *membrane*, of an elementary *fibre* of extreme fineness, and of *organic mucus*. From one or all of these are formed five classes of tissue, well defined in their characters, viz: 1. *Celluler tis-*

sue, or *parenchyma*; 2. *Pitted tissue*, or *Bothrenchyma*; 3. *Woody tissue*, or *Pleurenchyma*; 4. *Vascular tissue*, or *Trachenchyma*; 5. *Lactiferous tissue*, or *Cinenchyma*.

6. *Membrane* is certainly the most important of the three primitive conditions of vegetable substance. It enters into the composition of all the various tissues, and no doubt, forms the great mass of vegetables. Till very recently, it was a point of dispute whether any other existed, but recent investigation seems to have set the subject at rest, as to the real existence of fibre in many cases, and the researches of Mohl and others, have established the existence of organic mucus as a distinct form of vegetable matter, and perhaps a constant one. With respect to the *constitution* of vegetable membrane, two opinions have been held; one that it is an inorganic substance, destitute of fibres, like the fine film composing a soap bubble; another that it is organized. Du Hammell asserted that it was composed of small organic fibres united by a glutinous substance. More recently Lindley and Purkinje have shown—*the one* that it splits more readily in one direction than another—the other that it tears with a ragged edge. Both facts showing that its molecules are arranged in such a manner that they adhere more strongly in one direction than the other. Membrane, in its early stage, is extremely thin, but becomes thick by the deposition of other matter. It is entirely destitute of visible pores, nevertheless, is permeable to fluids under certain circumstances. Pores have been described as existing in the membrane, as it composes the tissues, but they have more recently been shown to be an optical illusion, except in an instance hereafter to be described. The apparent pores being pits within the membrane, making some parts transparent and thinner than others; that this is the case, has been proved by chemical action of substances making the membrane opaque when the pores ceased to be discoverable, and all the membrane of a uniform appearance.

7. *Elementary Fibre* exists in various parts of plants usually united with membranous vessels, and generally assuming a spiral direction. It has not been satisfactorily determined whether it is a simple fibre, or whether it is tubular. Most Botanists, however, consider it a simple, solid fibre. Its extreme fineness would lead us to this opinion, since the largest kind does not exceed 1-7000 of an inch. It is not always coiled; sometimes it is straight, at others curved, and sometimes forming a single line; at others anastomosing, and forming a reticulated tissue, and at others, branching. It in-

creases in size by the deposition of foreign matter, and by this means, attains a size much greater than its original dimensions. The elementary fibre of some of the lower orders of vegetables assumes a different and more varied arrangement than is generally the case in the higher orders. We cannot better give an idea of this arrangement, than by quoting from a memoir of Montagne, read before the Academy of Sciences, of Paris, in 1837, on the structure of the Caulerpa Webbiana: "In examining, by a compound microscope, a thin slice obtained by a transverse section of the creeping stem of the Caulerpa Webbiana, I saw that there sprung from the internal face of the tube a great number of flexuous filaments, transparent, continuous, slightly swelled at their origin.—These directed at first transversely anastomosing among themselves, and with those of the neighboring inferior and superior layers, in a manner to form an inextricable network. The network is not confined to the creeping root or to the principal frond, but continues to the highest branches. The filaments are smaller the farther they extend from the main body of the plant. In the extremities they do not exceed 1.30,000 of an inch in diameter, while at their origin they are three times as large." According to Schleiden, the formation of fibre never takes place independently of membrane.

8. *Organic Mucus* is a substance which has but recently assumed a place among the elementary forms of vegetable matter. But from the various researches of Mohl, Brongniart, and others, it has been demonstrated to be in many cases, a primitive condition of vegetable substance. It exists in the form of a thin homogeneous membrace, covering the cuticle of many plants, and forming a lining to the intercellular passages, or filling them up. It probably exists in all plants, in some form, if in no other than forming the cement by which the tissues are made to cohere. In the young shoot of the Sambucus nigra it is readily observed. Meyen considers the intercellular mucus a secretion of the cells themselves. The subject is of recent date, and more investigations will no doubt establish the true nature and functions of the Organic Mucus.

Section 1.—*Cellular Tissue.*

9. In its most common form it is composed of minute cells or little bladders, and in the living plant in a state of greater or less adhesion, and although the walls of the cells, when cut through, appear to be simple membrane, yet, in some cases,

they may be separated and individual cells be exhibited unconnected. If the pith of the elder be cut through by a sharp knife, the cut surface, even under a moderate magnifier, has the appearance of fine honey-comb; but if a piece be boiled in a weak solution of potash and water, and then gently rubbed, the cells will separate, which they could not do were the walls of simple membrane, and appear in the form of exceedingly minute vessicles, as in fig. 1. These were the cells that gave the honey-comb appearance to the pith when cut, before boiling. The pressure of the cells on each other caused the hexagonal appearance, and when freed from pressure, they assumed their natural form, that of minute spheroidal bodies. This form of the cellular tissue composes the pith of all plants, all the succulent part of fruits, as of apples, melons, peaches, cucumbers, &c. The soft part of leaves and bark and, a large part of the stems of annual plants; and in general, all the soft parts of the vegetable structure, are composed of these minute simple vessicles, assuming generally, more or less the hexagonal appearance when cut, as seen in fig. 2, from the slight pressure to which they are subjected.

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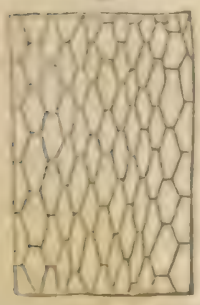

10. When the cells fit together by their plane faces like geometrical solids forming the pulpy substances, as in the above cases, it is called *parenchyma*, but when the vessels are elongated and tapering, the ends lying over each other, they form *prosenchyma*, (fig. 3.) of which the hardest part of the bark is composed, and a part at least of the wood and perhaps all of it.

3

11. The cellular tissue, besides the above common forms, assumes a great variety of appearances varying with the circumstances in which it is placed. In the stalks of some leaves the cells are in the form of cylinders, (fig. 4.) being forced only in one direction, by rapid growth. In the medullary processes they assume the form of regular thin parallelopipeds. In some cases they are lobed, owing, undoubtedly, to unequal pressure in the early stage of their growth; this frequently happens on the under side of leaves. There are other kinds of cellular tissue differently constituted from any of the preceding.

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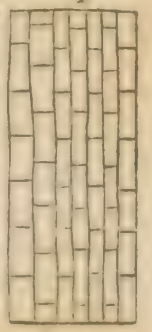

12. First, the *fibro-membraneous* cellular tissue consists of the usual cells with a fibre coiled spirally within them, (fig. 5.)

5

In some cases there are two fibres coiled in opposite directions. This variety is found in the skin of winged seeds. It constitutes the entire substance of some of the mosses, as the sphagnum. Second; Fibrous cellular tissue, consists of cells entirely formed of fibre twisted spirally, with no exterior membrane. This curious variety may be found in the lining of anthers; also on the surface of the seeds of the collomia linearis; by moistening them, the seed will soon be covered by a coating of the most delicate gauze. This gauze is the fibre of the cells uncoiled, (as seen in fig. 6.) This form is no doubt of the regular structure, in its earliest stage, but by growth, the membrane is torn into threads, corresponding to the internal fibre; or that the membrane is absorbed in the progress of development. Mirbel found the cells which line the anther of the gourd to be composed of continuous membrane, before the time of flowering. The fibres which form the cells assume a great variety of appearances, when they are broken, after the disappearance of the membrane. Lindley has noticed four varieties:

6

1. "Short, straight and radiating fibres, so as to form little star-like appearances, found in the lining of the anthers of the Polygala, by Purkinji.

2. "Fibres originating in a circle curving upwards into a sort of dome, and uniting at the summit, observed by the same anatomist, in the anthers of the Veronica perfoliata.

3. "Fibres standing in rows, each distinct from its neighbor, and having its point hooked so that the whole has some resemblance to the teeth of curry-comb, in the anthers of the Campanula.

4. "Fibres forming complete arches, as seen in the anthers of the Linaria cymbalaria."

13. We have given in the above paragraphs the appearance of those parts of the vegetable tissue which all allow to be of the cellular variety, and although varying so much in appearance, and constitution, yet we believe they all have originally the same organization. Their development under different circumstances, and the different functions they perform, have caused their diversity of constitution and appearance in a state of maturity.

14. The cellular tissue has been assigned to the same place in the vegetable economy, that the flesh occupies in the animal, and we have no hesitation in yielding to it in every re-

spect the importance this comparison will assign it. It constitutes the basis, physically considered, of the vegetable kingdom.

15. The cells of common cellular tissue are without visible pores, yet the walls are permeable to fluids, as is proved by their being sometimes full, and at others empty. This may also be shown by taking a piece of the pith of the elder and letting a part of it communicate with water and the whole mass will become saturated with it; and it is a fact well understood at the present day, that animal and vegetable membrane, even when not under the influence of vital power, is permeable to fluids under certain circumstances; that is when opposite sides of the membrane are exposed to fluids of different density. Although all cells have been considered perfectly closed, and in the great mass of cases this is no doubt true. Professor Roeper has recently made some important observations on the cells of the Sphagnum, and has demonstrated most satisfactorally, the existence of apertures in these cells, and that too, of quite large dimensions. He first proved their presence by the passage of the amylaceous grains of the *nymphaea-lutea* into cells which had been previously examined, and found free from any thing of the kind, but by immersion in water containing these grains, they were found to have entered the cells. During his examination of the elongated cells of the *Sphagnum obtusifolium*, he unexpectedly observed in some of the cells animalcules, and some of them making apparent efforts to escape; and after watching the attempts of one for several hours, he was gratified by seeing it issue from the cell; but instead of issuing into the water in which the cells, for examination, were placed, he entered another cell lying contiguous to the opening through which he passed, and Roeper remarks that the posterior part of its body was engaged in the first cell, while the anterior part had possession of its new dwelling, *de sa nouvelle demeure!*

16. The cellular tissue possesses the hygremetrical property in a high degree, and this power is applied in the economy of vegetation to most important purposes. The anthers burst by the exercise of this property; most of them in dry weather by the contraction of the cells on one side while those on the other remain distended. The bursting of capsules is the effect of the same cause, and one may convince himself of the truth of this assertion by closely inspecting the bursting of the common "Touch-me-not," the inner cells have become in maturity compressed firmer and smaller, while the outer ones are in moist weather turged and elastic, and by slight agita-

tion, the cohesive resistance of the valves is overcome and a sudden bursting of the capsules is the consequence; the equilibrium of the pressure being produced by the coiling up of the valves. The opening and shutting of flowers at certain hours of the day is undoubtedly another effect of the same cause. If we examine a plant, which opens and shuts during the day, we may readily observe a contraction of the cellular tissue on one side of the flexure, and a turgessence of the cells on the other side.

17. The cellular tissue is endowed with the power of reproducing itself. This is abundantly proved by the existence of vegetables consisting entirely of these cells, and the extreme rapidity with which they are sometimes generated, is strikingly illustrated by an example given by Prof. Lindley, of a mushroom, the cells of which he estimated to be produced at the rate of four billions per hour.

18. This tissue, at first soft and mucilaginous, becomes, by age, of a very different consistence, varying remarkably in its composition in different vegetables, and in different parts of the same vegetable. It always commences its existence, as we before remarked, possessed of the same organization, but in its maturity it may become the white, thin, transparent vessicle of the pith of the elder, or the hardened, thickened, unyielding prosenchyma of the wood and the liber. These changes are produced by several circumstances. In the elder all the substance of the cell except the exterior vessicle becomes the food of the plant. The *consistence* of a cell may be increased in several ways. First, by the generation of new cells internally, which of course would increase the density as the number is multiplied. Second, by the diminution of the aqueous part, and consequently proportional augmentation of the carbonaceous part. Third, by the combination of the organic substance with an inorganic, earthy, or metallic base which solidifies and transforms the almost mucilaginous incipient cellular tissue, into the firm, elastic, resisting prosenchyma. Fourth, by the deposition of resins, which have little or no affinity for water, and of course increase the hardness of the tissue in which they are deposited. We see this hardening of the cellular tissue strikingly illustrated in the hard gritty cells of the Quince and Pear. These gritty grains are occasioned by depositions within the cells, and are of the same nature as those that constitute the stone of the Cherry and Peach.

19. The parenchymous tissue is in general the depository of all the materials which in vegetables administer to the sus-

tenance of man. 'Tis here we find deposited the material that forms our bread, from whatever grain it may be manufactured. 'Tis the cellular tissue filled with an amylaceous substance that composes the edible part of the roots that are brought to our tables. The mealiness of potatoes as it is vulgarly called, is but the swollen and comparatively dry cells, which compose this important vegetable: the beet, carrot, and turnip, owe their value so far as they are suited for food, to the abundance of this tissue, developed in the cellular integument of the bark of the roots, and just in proportion as the other forms are developed, they become useless. The tough, fibrous form these roots sometimes assume in dry seasons, or poor soil and uncultivated state, is owing to the diminished quantity of the cellular tissue proper, and the abundance of the prosenchymous or woody form. Starch, arrow-root, &c. are but forms of the same substance. The various fruits are composed of cells filled with the various juices peculiar to each species. In the lemon we find the vessicles filled with an acid of considerable intensity. In the orange, and pine apple our taste is gratified by the mild yet delicious flavor of their contents. In the melon we meet with a fluid of a blandness, and insipidity, almost equaling fountain water. The various coloring materials drawn from the vegetable kingdom, used in the arts, have their locality in the same tissue. The coloring matter which produces the great variety of hues that elicit our admiration by their brilliancy and variety, is deposited in transparent cells. The satiny appearance exhibited by many highly coloured flowers, depends (according to Lindley,) on the highly colored fluid within the cell gleaming through the white shining membrane of the tissue. These subjects we shall notice more particularly hereafter.

18. The cellular tissue has of late occupied the attention of the most distinguished physiologists. In common plants, the opacity of the vegetable substance and the minuteness of the cells preclude all examination of their functions; hence the more simple plants have generally been the objects of investigation. The Chara Fragilis has long been a subject of notice. As early as 1774, Corti, an Italian physician of Lucca, discovered the circulation in the tube of the Chara. Fontana, also an Italian, published in 1776 a repetition of Corti's experiments, and the discovery of a similar circulation in other plants. These curious observations were neglected till 1807, when Treviranus observed the same phenomena, being ignorant of the previous discoveries. In 1818, M. Amici of Modena, published his observations on the circulation of

the Chara Vulgaris, and afterwards on that of other species. Pouchet and Meyen have extended their observations to other plants and succeeded in detecting a circulation in the Valesneria, Stratiotis, Potamogeton and in the hairs of the Impatiens balsamina, Vicia faba, (common bean) Cucumus sativus, (cucumber) and many others. More recently the Chara has been most minutely and laboriously examined by Dutrochet, and the result of his experiments was read before the Academy of Science on the 4th of December 1837, and published in January 1838. We deem some points of his observations important in this place, that the student may have a true idea of the constitution of a class of the cellular tissue. The Chara is an aquatic plant of the tribe Muscoidiæ, consisting of slender stems with a central tube surrounded by numerous small cortical tubes, all filled with a fluid with small globules floating in it. The roots also are of the same construction, and contain the same kind of fluid, suspending like globules. The tubes of the stem are lined on their inside with innumerable green eliptical globules placed end to end, which are disposed as seen in fig. 8, in a highly magnified stem of the Chara, the spiral series being attached to the membranous tube by a very slight cohesion. Figure 9, gives a transverse section of the Chara highly magnified, in which the cortical tubes are seen arranged in a circle around the central tube, generally eighteen in number. By removing the cortical tubes with care and applying the microscope, we observe the floating globules following with perfect regularity the direction of the spirally arranged globules attached to the tube. The ascending current when it arrives near the node, turns and forms a descending current on the opposite side following with equal regularity the green globules. Between these two currents there is a line destitute of green globules, and under which the fluid does not circulate, and which is called the line of repose. Figure 8 will give the student an accurate idea of these appearances. If the green globules make accidentally any sinuosities the floating globules follow these sinuosities. If the green globules

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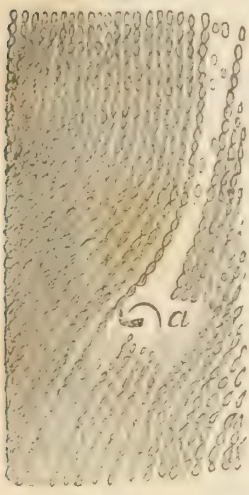

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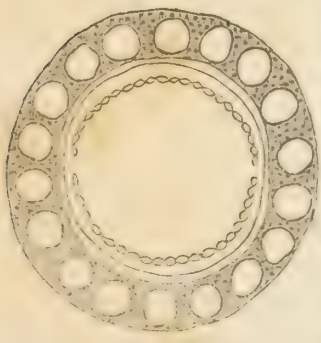

are removed in any part, the current is arrested at this point and the floating globules accumulate there, until finally they are deflected from their course and return by the opposite current, as seen at fig. 8, *a*. These phenomena occur in perfection only in the young internodes. As the parts become old, the globules become detached in spots, the current becomes irregular in proportion. In more advanced age they often become entirely removed from the surface of the cell and float in the contained fluid, which ceases to circulate. At other times they entirely disappear.

21. Any cause, which will accelerate or retard vegetation, accelerates or retards this circulation. Within certain limits heat will accelerate the movement, and cold retard it. Excess of either will destroy it entirely, as it does the life of the plant. Light and atmospheric air are necessary for its continued motion. Poisons act variously on the circulation and the motion of the intercellular fluid is a true index of its effect, as its change is the first indication of their influence. This plant has been made the means of determining what substances are poisonous and their mode of action, and is said to be the most delicate test for a poisonous substance, and is called by Raspail a *Toxicometre*.

From these observations it is evident that the propelling power resides in the green globules. It is by no means necessary, however, that the globules should be green, as the same arrangement is found in the roots and the same circulation takes place, and the globules are white. To observe this circulation two conditions are absolutely necessary. First, that the vessicle should be transparent. Second, that it should have globules floating in it by which its movements may be detected. Should the walls of the cell be transparent with a uniformly dense fluid circulating within it, it would be impossible to distinguish its motion.

22. To discover the immediate cause of this circulation has exercised the ingenuity of many philosophers. Amici advanced the idea that the motion of the fluid in the cells was owing to an impulse given by the young globules, acting as a galvanic pile; but M. Becquerel and Dutrochet made various experiments on the subject, and from the result concluded that the force, which produced the rotary motion of the fluid within the vessicle, is not electricity. Electricity, by the battery, would suspend the movement when of sufficient intensity, but exerted no other influence on it. This effect was without doubt mechanical, as it made no difference how the poles were arranged in reference to the rotatory movement of the

globules. This phenomenon, then, in the present state of our knowledge, must be placed among those facts, which can receive no other solution than that of referring them to a vital force as their cause. That we need seek for no physical cause, seems to me evident from the numerous researches and experiments of Dutrochet. In all cases where suspension or acceleration was produced by any agent, reaction took place sooner or later where life was not destroyed, which would not take place did its movement depend on a physical power, so far as we are acquainted with the operation of physical forces. Reaction of such kind never takes place but under the control of vital power. From the above facts it seems we are warranted in the assertion that the seat of vitality in plants resides in the globules attached to the internal walls of the cells.

Those who are desirous of examining the subject in all its bearing will find abundance in the original memoirs of Slack, Pouchet, Mayen, Mirbel, Raspail, and Dutrochet; most of them published in the Annalles des Sciences Naturelles, also in Lindley's Introduction to Botany, Raspail's Physiologie Vegetale, and in his Chimie Organique.

23. The above description of a cell and its circulation, applies to all the cells of the lower orders of plants at least; but in the higher orders, we have a somewhat different arrangement.

In some cells comprising the tissue of leaves, the hairs of plants, and the ovule before impregnation, a body has been observed for some time past: but which has received but little notice till quite recently. We are indebted to Schleiden for a more minute examination into the constitution and functions of these nuclei. He calls them *Cytoblasts*, which are of a roundish or linticular form, and of a white or yellow color. The Cytoblast is usually of a granular structure, and of various degrees of consistence—sometimes soft, and at others of sufficient hardness to resist considerable pressure, The origin of the cytoblast is said to be from a minute body. around which the other parts of the cytoblast are formed. "If the gum which is found in the youngest albumen of a plant be examined, it will be found turbid with molecules of extreme minuteness. Of these, some acquire a larger size, and a more definite outline than others; and by degrees, Cytoblasts appear, which seem to be a granular coagulation round each molecule. As soon as the cytoblast has attained its full size, there appears upon it a fine transparent vessicle. This is a young cell which continues to swell out, and its lining becomes formed of jelly, with the exception of the cytoblast,

which soon becomes a part of its wall. The cells keep increasing in size, till at last the cytoblast is only a minute body, imbedded in the side of the cavity, or sometimes loose in the cavity. The cytoblast is sometimes absorbed after the growth of the cell, and at others is permanent as in the hairs of the Tradescantia."

The cytoblast seems to exercise the same influence on the circulation in the cells, which contain them, as the green globules do in those of the Chara, and like constructed cells. This may be beautifully seen in the hairs of the Tradescantia and Cucumis. The currents receive their impulse from the cytoblast, and return to it: as the cytoblast in time becomes absorbed, the current ceases.

These two classes of circulation are well established, and we are led by the most conclusive evidence that every vegetable cell in its earliest state has for its type the construction of the Chara, or that of the cell with the cytoblast; and the cytoblast seems to perform the same functions as the green globules.

Section 2.—*Pitted Tissue.*

Dotted Ducts, or *Bothrenchyma* (fig. 7) is formed of a series of short cylindrical cells, placed end to end, and in their young state may be separated into the individual cells which compose the tubes; but as they advance in age the separating membrane closing the ends of the cylinders is ruptured, thus forming a continuous tube; this may be distinctly seen, under favorable circumstances, in the hickory or oak, where the membrane may be seen ruptured in some cases on one side, leaving the membrane attached to the other side, assuming somewhat the appearance of a valve; in others it is ruptured in the center—the membrane cohering to the sides of the tube. They are the largest of the vessels and are scarcely found in any other situation than the wood. They are very distinct in the beach, oak and hickory, being the largest pores observed on a transverse section of these several kinds of wood; but in the pine, and trees of the same family, we believe they are never found. This form of tissue derives its name from rows of dots regularly arranged on its inner surface which are supposed to be grains of amylaceous substance.

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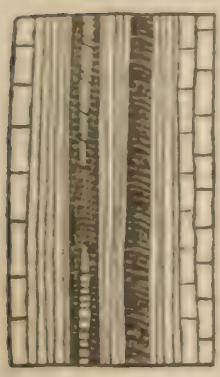

24. Under this form of tissue is usually arranged a variety found mostly in the roots of plants, which appear to be spiral

vessels with the fibre broken into short pieces, and attached to the tube and is called *Continuous Bothrenchyma*, differing from the one above described in having no interruptions caused by the adherence of the cells.

Section 3.—*Woody Tissue.*

25. The woody tissue consists of elongated vessicles tapering at each end to a very fine point, (fig. 10.) It is customary to consider this tissue as a distinct variety, yet, although it is convenient to consider it by itself, we believe it is only another form of the cellular tissue. Several objections are urged by different botanists against its being considered a form of this tissue. First, its toughness, but this property it acquires by deposition of foreign matter, and by the number of fibres found associated together. Second, its length; but this is not a valid objection, since we know no reason why a cell may not be developed indefinitely in any direction. Third, its tapering extremity; but we find cells not unfrequently attached to each other by a slanting, pointed termination. Our reasons for believing it a modification of the common cellular tissue are, First, in many instances they run imperceptibly into each other, and in their young state cannot be distinguished. Their constitution, and arrangement of the parts in their early stage, are also the same. The tubular form of the fibre having a pointed termination at both ends, is admitted by all, and this is the form a cell would necessarily take if developed only in length.

10

26. It is the fine shining fibres, which are readily distinguished in wood, and which are composed of many woody fibres, formed into bundles. So minute are the individual fibres, that the finest filament of flax, which is composed of woody fibre, is made up of a great number of these fibres joined together; their fine tapering extremities being spliced to like fibres, as seen in fig. 10, which go to make up the long fibre extending through the whole plant. Cotton is of the common cellular formation. A modification of the woody fibre occurs in the coniferous plants; the individual fibres are larger in this family, and are marked by glandular dots regularly arranged as seen in fig. 11, and these may be easily seen in the thin longitudinal slice of the pine placed in water and viewed through a microscope.

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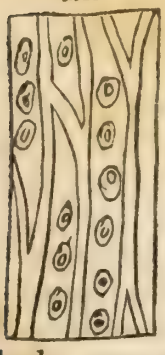
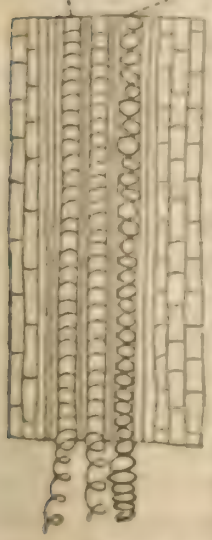
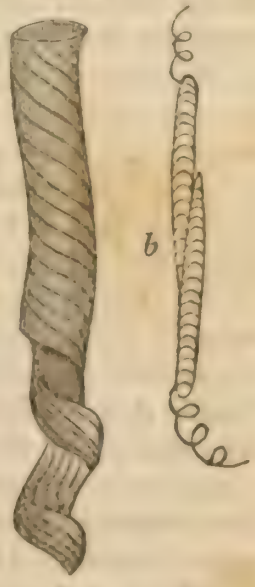


27. It is this form of tissue that gives strength to vegetables. Without it the stems of trees would be unable to bear their own weight, much less could they be used, as they now are, as materials of great strength. The branches of the oak, or hickory, destitute of the woody fibre, would break as easily as the mushroom. Besides forming a part of the wood, it is found in the bark and midrib of leaves. It protects other, and more delicate portions, and gives form to the plant, appearing to occupy the same place in the vegetable economy as that of bones in the animal. In its early stages it is endowed with the vital power in a high degree; but in the progress of development the fibres receive large additions of solid matter, and their density increases until their hardness and rigidity unfit them for vital action, but make them a support for the plant, and prepare them as materials, for the use of man. It is more than probable that the woody fibre is capable, at some stages of its existence, of conveying fluids, but the minuteness of the fibres has as yet presented an insuperable difficulty in determining whether the fluid passes between the fibres or through them.

Section 4.—*Vascular Tissue.*

28. This tissue consists of a tube formed by an external membrane, with an elastic fibre closely coiled within it, (fig. 12 *a*.) Sometimes there are two fibres coiled in opposite directions, as seen in fig. 12, *b*; at others there are several fibres forming something like a ribbon, as seen in fig. 13, *a*.





The above defines the normal form of this tissue, but the variations are numerous, owing to situation and development. This form of tissue may be easily seen by taking a tender branch of the Pokeweed, and cutting one side just through the outer layer, and then bending it so as to make the edges separate, and there will be seen a coil of the spiral vessel connecting the two surfaces. Other young branches will answer the same purpose, some equally

well with the one named, as the Asparagus, Strawberry, Currant, Dogwood, &c. In the above cases the vessels are not seen in their natural state, since they are seen uncoiled. In the stem, the fibre that we see uncoiled when pulled apart, forms a complete tube by its edges coming in contact in coiling. But if either the Poke-weed or Asparagus be boiled, they may then be found in their natural state, having a conical termination, as exhibited in fig. 13, *b*.

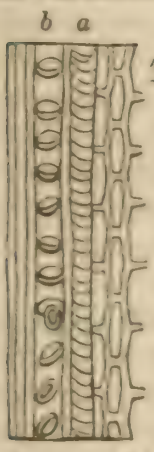
29. The spiral vessels are found in exogens in a layer surrounding the pith called the medullary sheath, from which they pass into the leaves and form a part of the ribs of those organs. They are found in the sepals, petals, stamens, and pistils, which are modifications of leaves. In endogens they occupy the central portion of every bundle of woody matter. In acrogens the true spiral is not found, but a modification of it is found in all the Ferns, Equisetacæ, and it varies in some cases but very little from the true spiral in the last named family. More extended observations are needed to settle this question.

30. The office of the spiral vessels in the vegetable economy is far from being determined. They derived the name soon after their discovery, (by Grew, I believe) of Tracheæ, from the supposition, that they perform the same office in vegetables, that the organs of the same name perform in insects, but their true function is yet unsettled. Many experiments have been adduced to prove that they contain air only, and many also to prove that their original function is to convey fluids to the recently developed vegetable tissue. Both perhaps are true. In their earliest stage they certainly contain fluids, and in the more advanced stages, it is equally certain they contain air, as may be shown by cutting a stem under water, and bubbles will be seen to form at the mouths of the spiral tubes. Bischoff has obtained the air and analyzed it, and found it to contain six or seven per cent. more of oxygen than common air.

31. We think we may safely conclude that the true spiral vessels perform different functions in different ages of the plant, and the more important of the two, and for which this tissue is peculiarly adapted, is that of the earliest stage. We find it in the earliest development of the plant. The extreme point of formation where the matter seems to be just passing from mucilage to organic substance, we find the spiral vessel. It seems to me that in this case we find an adaptation peculiarly fitted to accomplish a given end, and it would require not a very great stretch of imagination in con-

ceiving the design of nature in giving to this tube the form she has. It is the only kind fitted to convey nourishment, and give support to the tenderest shoot as it protrudes to light.—If a common cylindrical tube were used, the great flexures made by such tender parts, under the influence of wind and rain, would be very liable to crush the tube on one side or tear it asunder on the other, as it is well known that a tube cannot be bent without injury, and it is equally well known that a coil may be bent in any direction, and return to its first position uninjured. Here nature in her wisdom, has adapted organs to the necessity of the case, and she only uses this kind where the above circumstances seem to demand it, as they are never found in any circumstances where they are not terminated with the organ.

32. The varieties of this tissue as exhibited by the microscope are numerous, but we shall notice only a single kind of its variations. Annular ducts, as they are called, are tubes in which the spires are apparently broken into rings and joined at their extremities. Sometimes the rings lie in regular order and in contact with each other, having the appearance of the true spiral vessel, as seen in fig. 14, *a*. At another time the rings appear separated and irregular, and are detached from the tube and lying lengthwise in it, as seen in fig. 14, *b*. These appearances may be seen in the stem of the Impatiens, and other forms will be readily detected in the same plant. We deem it inexpedient to occupy space in describing varieties of vegetable tissue, which are reducible, by the least sagacity, to a primitive form.



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Section 5.—*Cinenchyma, or Lactiferous Tissue.*

33. *Cinenchyma* is a class of tissue but recently demonstrated by Professor Schultz. It consists of minute tubes anastimosing with each other, and arranged in no definite direction, in reference to the other tissues. The tubes are of very different diameter in different parts. The vessels generally take a waving direction, seldom proceeding in a straight line. The tubes become thickened in age by the deposition of new matter. The Cinenchyma is found in greatest abundance in the liber of the bark, across the parenchyma of the leaves; but, no doubt, exists in almost every part of Flowering plants. It has been detected in

the pith, in the bark of the roots, in connection with the spiral vessels, and it is said, in the cells of hairs. We have readily detected this tissue in the liber of a vigorous fig, in which the vessels were distended with fluid. We failed in many attempts, in distinguishing the cinenchyma, until we adopted the following course: by applying a ligature to a branch of fig so tight as to prevent circulation, we then cut the branch below the ligature, and with care, removed half of the bark and all the wood of an internode, and by carefully reducing a portion of the bark to a sufficient thinness, and removing the exuded sap, we brought the thin portion under the microscope, and saw, in the most distinct manner, the tubes distended with fluid, and the vigorous circulation made visible by the numerous globules floating in the enclosed fluid. This circulation is denominated *Cyclosis*, of which we shall speak hereafter. This tissue is called the Lactiferous, from the circumstance of its containing the milky juices of plants. When the Fig, Lettuce, Asclepias, and Euphorbia are wounded, a milky juice immediately issues; this proceeds from the severed vessels of the cinenchyma. Although in these cases the *latex* (the name of the fluid contained in this system of vessels) is white, in others it is colorless, and in some yellow. It is the most highly elaborated juice of the plant, and the sap seems, in this system of vessels, to be prepared for the nourishment of the plant.

34. We have given above the forms of tissue which go to make up every vegetable, from the humblest plant to the largest tree of the forest. However various their forms and appearances, they are all composed of one or more of the above varieties. It becomes a subject of prime interest to the inquiring Botanist, to trace the origin of these several tissues.—Much labor has been bestowed on this subject, and much discussion has been occasioned by the different views of different individuals. There are two prevailing opinions on the subject. Some believe that there are several primitive forms of tissue, formed directly from the vegetable membrane as before described. Others are of the opinion that cells only are formed from this membrane, and that all the other tissues are variations of the cellular. We have already expressed our belief that the woody fibre is a modification of the cellular tissue. We are equally convinced that the spiral vessels and cinenchyma have the same origin. The following are some of the considerations which have led us to this conclusion.—First, in the earliest stage of the embryo, nothing but cells are to be discovered, by the most powerful instruments. Se-

cond, the spiral vessel is terminated by a conical extremity, and of course may be considered an elongated cell. Third, there is no difference in their constitution, their only difference being in their length, and in their earliest stage are said to be undistinguishable from a cell. The difference of length cannot in the present state of our knowledge constitute a sufficient distinction, for Mirbel, as well as others, have seen a cell develop itself into a tube terminated by a point. Mr. Quickett has shown that the spiral vessels are developed in the same manner as the cellular tissue, as described in 23—that it is at first very difficult to distinguish the spiral vessel from the cell; but that soon the vessicle, destined to become a spiral tube, elongates, and the cytoblast disappears. The contained fluid becomes filled with minute granules, which increase slightly in size, and begin to arrange themselves on the internal surface of the tube, in a regular and determinate manner, according to the spire formed. After the arrangement of these molecules, matter is deposited to fill up the spaces between them, and thus the spire becomes formed. The above are the most important points applicable to the subject, taken from a paper recently published by Mr. Quickett, and certainly they give a most beautiful exhibition of nature's workmanship. Raspail, although, in many respects, singular in his hypothesis, asserts that cells have the power of producing vessicles both from their internal and external surfaces, and that those produced by the internal surface are globular, and form the true cellular tissue, while those generated on the external surface are produced in length only, and form every other kind of tissue.

We are attached to no theory on the subject, and we have simply stated our conclusions drawn from the various facts observed by ourselves and those recorded by others, and the above opinions we would readily yield, should future discoveries prove them untrue. The only object at which we aim is the inculcation of truth. Nature is our theme, and he that would enter on an investigation of her works with any other spirit than that of humility, accompanied with a desire to take her as she presents herself in all her varied forms of harmony and beauty, profanes her sacred temple and forfeits, by a sacrilegious spirit, all claims as her votary. Our limits forbid our introducing here, numerous experiments or advancing many arguments; these must be left for more extended treatises, and the lecture room. The writings above quoted may be consulted, where all that is at present known on this intricate and interesting subject may be found.

INTERCELLULAR PASSAGES.

35. In the placing together the various tissues, which are either globular or cylindrical, spaces are necessarily left between the walls of adjacent cells or tubes, which are called intercellular passages. The appearance on a large scale may be illustrated by the spaces, that would be seen in a pile of bladders which would exhibit these passages in the cellular tissue, and the space seen in a bunch of cylindrical rods bound together, would exhibit those seen in the vascular tissue. These spaces are always filled with fluid, and are supposed to afford an important channel for the transmission of sap from one part of the plant to another. The proper juices of plants often collect in those cavities, and by its pressure, they become enlarged, and afford receptacles which contain large quantities of the peculiar juices of plants; such is the case with the cavities in the bark of the pine and balsam; in the latter they are very large, and also in the rind of the lemon, and orange, in which are deposited the peculiar secretions of these plants. Air-cells, are cavities built up by cellular tissue in the leaf or stem for the purpose of enabling the plant to float on water. They occur in the leaves of the aquatic varieties of the Ranunculus and Duckweed.

CHAPTER II.

ORGANS OF PLANTS.

36. In the preceding chapter we have described in a brief manner the various tissues which enter into the composition of vegetables. Our next object will be to describe in the same manner the various organs these tissues compose. An organ is a part of a living body, the form and limits of which we can describe with precision, but to determine all its functions is not in some cases so readily accomplished. It is the center of a special action, but not independent of the other organs which go to make up the being to which it belongs. It may be composed of other organs more simple than itself. Thus the leaf, which is an organ, and the center of a special action is, at the same time composed of more simple organs, as cells and vessels, which are called elementary organs, and the leaf a compound organ. In describing the various vegetable organs, we will take for an object of demonstration and comparison, one of the most complicated and most perfectly devel-

oped vegetables. If we take a tree for instance, we find it composed of various well defined parts; and to describe a tree, taking it part by part, we shall describe all the compound organs which go to form the whole vegetable kingdom. We find it in the first place, covered in its earliest stage at least, by a thin membrane extending over the whole surface from the deepest root to the highest leaf, called the *cuticle*. Within this covering we find another distinct zone, called the *bark*; within the bark we find the main axis of the plant called the *wood*, which is composed of two portions, one ascending, and called the *stem*, the other descending, and termed the *root*. Within the stem we find a soft spongy substance, denominated the *pith*. To the root and stem are attached branches, and to those of the stem are attached leaves, flowers and fruit.

We shall describe the above organs in the order laid down.

Section 1.—*Cuticle.*

37. The cuticle is composed of flattened cells, adhering to each other by their edges, and forming a continuous covering over the whole plant, except the stigmatic surface, spongioles and parts growing under water, and is generally composed of a single layer of cells, but sometimes in succulent plants of two or more layers. The cuticle of the Oleander is composed of three or four layers of thick sided cells. The joining lines of the cells may be seen on the leaves of plants by the microscope, presenting, generally, hexagonal figures more or less regular. Sometimes, however, the lines produce irregular figures, assignable to no geometrical form. The cuticle may be easily separated from the subjacent layer of the leaves of the iris or lily, by means of a sharp knife, and examined in water by the microscope. If the microscope be good, the cellular cavities will be easily seen, otherwise the flattened surface only can be distinguished. It seems to be pretty well established at the present time, that over the cuticle there is a covering of organic mucus, extending over not only the cuticle proper, but over its most minute appendages, the finest hairs. It has been demonstrated in many instances, and no doubt is an universal fact.

38. On the lines which separate the cells that compose the cuticle, small oval spaces are observed, which are called *stomates*, in allusion to the function they are supposed to perform, that of mouths through which the plant respires. These stomates are curiously constructed, generally consisting of two

oblong cells, placed parallel to each other on opposite sides of the aperture, as seen in fig. 34, and have the power of expanding, and thus shutting the orifice, and at others of contracting and curving outwards, and thereby opening it; thus the respiration and evaporation of the plant is controlled by these little cells. Of these we shall speak more particularly when describing the functions of the leaves. With regard to the origin of stomates, considerable discussion has been carried on, but no very satisfactory conclusion has been arrived at. Schleiden and Link are supporters of different opinions. The former supposes that the stomates result from the limit of development of cytoblasts; that two internal cells are developed, and by the absorption of the parent cells, the space between them becomes the stomata, and that the cells forming the stomatic sphincter differs in no respect from the other cells. The latter believes the stomates are secreting glands, and not mere openings in the cuticle for the transmission of air and gases.

39. The cuticle gives rise to various little organs which are classed under the heads of *Hairs*, *Glandular hairs*, *Stings*, *Prickles*, *Scurf* and *Lenticels*.

1. *Hairs* are short acicular bodies found on the surface of many plants, and almost as various in their form as the plants on which they are found. To examine their structure, a good microscope is absolutely necessary. In the spider wort, (Tradescantia,) the hair is composed of cells placed end to end, and has the appearance of the antennæ of insects, and in these cells a circulation is distinctly visible. The sides of these cells are double, although the wall of a cell under common circumstances, appears of simple membrane. That this is not the fact, is proved by permitting the cell to dry on the field of the microscope, and the membranes will separate, and a space is observed between the membranes. It is in this space, that the cinenchyma is located, and in which tissue the observed circulation goes on.

2. *Glandular hairs*, are such as possess the power of secreting various substances which give the peculiar odor to some plants. They are terminated at the top by an enlargement of the hair sometimes containing cavities in which the secretion is deposited before being set free, at others by a cup-like cavity, answering a similar purpose.

3. *Stings* are sharp stiff pointed hairs, which take their rise from the summits of conical reservoirs composed of many separate cells, which are filled with a poisonous fluid secreted by these organs. The sting has an orifice at its summit,

connected with the cells containing the acrid secretion; and by the force required to pierce the skin it presses upon the cavities which propels the fluid up the tube, and injects it into the wound made by the point. It is this poison which causes the severe pain occasioned by the sting of the nettle.

4. *Prickles* are hard, sharp pointed, stiff productions of the cuticle, often hooked at the extremities. When the prickles have acquired their full growth, they are quite firmly attached to the stem; but as the stem advances in size, the prickles, remaining of the same dimensions, become loosened at their base and fall off. Hence, old stems are seldom covvered with prickles, while the younger ones are prickly.

5. *Scurf*, or *Lepides*, appearing to the naked eye like a mealy substance on some leaves, are scales attached to the stem by their center, and seem to be formed by the cohesion of many hairs having the same point in the cuticle for their origin.

6. *Lenticels* are brown spots appearing on the stems of many trees and shrubs, at first nearly round, but as the stem increases in size, they assume a linear form, and produce transverse spots on the surface of the stem, as may be seen in the cherry, willow, birch, and other trees and shrubs. By a closer examination, we find the Lenticels to consist of a corky substance apparently projecting through apertures in the cuticle and being divided into two lips by a medial slit. By cutting through one of these lenticels transversely, and examining it by a microscope, the student will find that they are placed on the external layer of the bark, between it and the cuticle, and that it has no connection with the bark, much less with the wood. Hugo Muhl has demonstrated that these productions, generally at least, have their origin in cells lying between the cuticle and bark, and arranged in regular series perpendicular to the axis of the stem; and that they are smaller than the cells of the subjacent parenchymous layer of the bark, and that by an opening in the cuticle they become exposed to the air, and develop themselves in the dry, brown, corky mass, denominated lenticels.

40. From the above description, one would not expect that they could form a subject of much interest, but it would require volumes to contain the discussions of the learned on the functions of lenticels. De Candolle has asserted that they are the origin of adventitious roots. This opinion was founded on the fact that when a piece of willow was placed in water, the root protruded, through the lenticels, but it has

been most conclusively proved by Hugo Muhl, and Professor Unger, that there is no necessary connection between the lenticell and root; and moreover that adventitious roots are made to spring from parts where a lenticel was never seen. The student would be little benefited by the numerous views taken of these products when in reality they probably have no function at all, as lenticels, or at most serve only as passages for air beneath the cuticle.

Section 2.—*The Bark.*

41. *The bark*, which lies immediately beneath the cuticle, consists of an external layer of green spongy substance, as seen in fig. 15, *b*, and an internal layer of fibres interlaced with each other, and the interstices filled with cellular tissue as seen in fig. 15, *c*. The first is called the *Cellular Integument*, and the second the *Liber*. The cuticle, cellular integument, and liber, may be very readily examined in a branch of the cherry of one year's growth. The cuticle will readily peal off, tearing transversely. The cellular integument may then be easily separated from the subjacent liber. The two layers of the bark are each formed every year, and of course the thick bark of old trees is made up of alternate layers of cellular integument and liber. From the enlargement of the stem, and the internal formation of bark, the outer layers become distended and broken, and thereby produce the rugged appearance of some old trees, and the annual peeling off of the bark of the sycamore, which, from the slight cohesion of the different layers, falls off as soon as broken, not forming the longitudinal ridges like those of the oak and pine. An examination of the bark of an old pine will give the student a correct idea of the effects produced by the constant enlargement of the stem, and the yearly deposition of the bark. Instead of finding regular layers of bark, he will observe, that the bark consists of irregular plates, each being composed of two lamena, one thin and membranous, the other thicker and of more consistence; but in most cases, exactly corresponding to each other in form. These two lamina correspond to the cellar integument and liber, and the cause of their existing in irregular plates instead of layers, is their distension until the layers become torn, and the parts separated. It not unfrequently entirely decays, thus showing that it is necessary only in the early stages of the plant.

40. *The liber* is composed of woody fibre and cylindrical vessels, a modification, undoubtedly, of the spiral. These together form the strong fibres, which compose the net work of this part of the bark. The fibres of the liber, from their tenacity and interlacing, are often made materials for use. The bark of the flax and hemp consists of these fibres, and when twisted together constitute the cordage, thread, and cloth, which are manufactured from these plants. The fibres are sometimes so closely and firmly interwoven as to be used as a substitute for manufactured fabrics for clothing, with no other preparation than that of separating and flattening the layers. Jamaica and the Sandwich Islands afford examples of these productions. A beautiful lace is obtained by the natives of the Pacific and West India Islands, from the liber of different trees of the Mezerium tribe. Cordage also is manufactured from the liber of trees of the same family, and our own Dirca, did it grow to sufficient magnitude, might afford beautiful examples of the same kind of nature's manufacture. From the liber of the Daphne bohlua of Nipal, a very soft, beautiful paper is said to be manufactured. The liber of trees, before the invention of paper or parchment, was stripped into layers, flattened and cemented into leaves which formed books; and it is from this circumstance that it derives its name. The Russians also manufacture mats, which bear their name from a species of the Tillia, (Linden tree.)

41. The cellular integument is not without its uses, deriving its value, too, from its peculiar structure. It is the immense development of this integument, that forms cork, so extensively employed for various useful purposes: and as we have before remarked in paragraph 17, it is the development of the same material in this part of the bark, that constitutes the value of many of the garden vegetables, which in their primitive, uncultivated state, are as unfit for food as any other kind of root; but the effect of cultivation in good soil, is to increase the cellular integument without increasing the liber; thus fitting the roots for becoming food for men and animals.

42. In a great number of trees, the bark is made the depository of important articles. *Tannin* is found in the bark of several species of the *Quercus*, or Oak, and in the *Pinus Canadensis*, or Hemlock, by which raw hides are converted into leather. Gum is also an abundant product of the bark, and is scarcely found in the wood. *Coloring matter* is often found deposited in this organ, though not so generally as in the wood. *Medicinal* substances of every grade, from the

mildest mucilage of the Ulmus fulva and Bene plant, to the most powerful poisons of the Daphne Mezerium, and of those yielding the Hydrocyanic or Prussic Acid. Numerous examples might be added of the important productions of this organ, but they will be reserved for a future section.

43. *The functions* of the bark taken as a whole, seem to be the protection of the newly formed wood, the secreting of various products, and forming a channel through which the descending elaborated sap may pass to the various parts of the stem. The functions of the cellular integument and liber separately considered have not been determined. There appears to be plausibility in the conjecture, that the cellular part of the bark, being deposited first, acts the same part in the formation of the liber, that the pith performs in a newly formed branch, that of affording nourishment, if it does not act some part in generating the fibres themselves. If, as has been supposed, the cellular system is the generating apparatus of vegetables—and that it is in some cases, we have the best evidence—will it not afford a probable reason for the alternate layers of the cellular and vascular tissues by supposing that the cellular tissue being first deposited, then acts as the generator of the fibrous tissue of the liber!

Section 3.—*The Stem.*

44. *The Stem* is the ascending axis of the plant. The descriptions given in the preceding sections on the cuticle and bark, will apply to them in all cases where these organs are found; but no such general description can be given of the stem. There are three distinct types of this organ, each of which necessarily requires a distinct description. First, *Exogenous* stems which increase by external layers of woody substance, and are covered with bark, and enclose a pith in their center. The term is derived from two Greek words, *Exo* outwardly, and *Geno* I produce. The term was given by De Candolle to designate all those plants, which increase in diameter by the addition of external layers, and includes all the trees and shrubs of the Temperate zone, and all plants which have true bark and reticulately veined leaves, whether woody or not. If we take a stem of the oak, for instance, and make a transverse section of it, we observe that the woody part of it is composed of concentric layers of hard woody substance, which consists of vascular tissue and woody fibre, closely united. These layers are partially separated from each other by a more porous, and of course, less dense layer,

which consists of tubes and sometimes of cellular tissue. If we commence our observation from the pith, we shall observe immediately surrounding it a very thin greenish layer, called the medullary sheath, represented in Fig. 15, *f*. Immediately in contact with this is a zone of cellular substance and tubes, as seen in Fig. 15, *g*. Next to this a dense woody zone as seen Fig. 15, *h*. The last two layers are deposited annually, and always in the order laid down; so that if we begin to reckon from the medullary sheath, we find first the cellular substance and then the woody layer, and so on to the bark; the cellular always commencing and the woody layer always ending the series.

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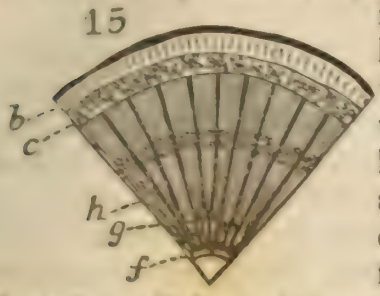

45. *The medullary sheath* is composed of spiral vessels and woody fibre connected by cellular tissue. It precedes every other formation except the cellular, in the elongation of branches. The leaves derive their origin from the medullary sheath. The true spiral vessels are found in the stem of exogenous plants only in the medullary sheath. In paragraph 25 we gave our opinion as to the reason for spiral vessels being found only in this organ. They are certainly required in the earliest development of the vegetable, and no increase in length of vascular vegetables ever takes place in which this form of the elementary organs, does not enter into its formation. And we very well know, that every function, except what its physical properties enable it to perform, is performed by other varieties of tissue; and to our mind there is not a more beautiful instance of adaptation and design, or a clearer illustration of Infinite wisdom in the constitution of the vegetable kingdom, than is exhibited in the structure of the organ under consideration.

46. If we examine our transverse section again, we shall perceive that the woody part is separated apparently into numerous wedge shaped portions, their bases terminating in the bark, and their apices in the pith, as seen in Fig. 15. By a longitudinal section made in the direction of these lines, we shall find that they are plates of substance proceeding from the pith and terminating in the bark. They are called *medullary processes*, or *medullary rays*, and are composed of cells in the form of thin parallelopipeds. In the embryo, and in the earliest development of the stem, the cellular substance of the bark and pith, are in contact, but immediately vascular and woody fibres are sent down, which pierce the cellular substance, dividing the mass of the pith from the parenchyma

of the bark, but leaving them connected by the medullary processes; so that parts, which were in contact in the early stages, become separated, sometimes by several feet, yet a communication is preserved by the medullary rays, which continues as long as life lasts.

47. Each of the layers of wood, as we before remarked, is the product of a single year, and by counting these layers the age of the tree at the point of section is readily determined, and by finding the difference in the number of layers between any two points of section, will determine the time that the tree was growing the distance between the sections. For instance, if we should count the layers of a stick of timber, and find the number twenty at one end, and ten at the other, it would show that ten years were required for the tree to increase in length the distance between these points. From these facts, we readily perceive, that trees must be composed of concentric conical sheaths; the product of the first year forming such a sheath around the pith, and that of the second year forming a layer around the product of the first year and the pith; the pith extending through the whole cone. We also observe, that the mode of increase is inverse to that of the bark, for the bark we found increased by an internal layer of cellular integument and liber, and we now find that the wood increases generally by an external layer of cellular matter and woody fibre, the layer of woody fibre and liber always being in contact when the layers are completed. We may readily convince ourselves of the inverse growth of the bark and wood, by inserting two wires, one through the bark, but not so as to touch the wood, and in time this wire will fall off, having no deposit made exterior to it; but by inserting the other wire, so that it shall pass through a slight portion of the wood, instead of falling off, it will become buried deeper and deeper every year by the layers of wood that are formed over it—thus proving most clearly the order in which the wood and bark are formed.

A remarkable case of the deposition of external layers of exogenous stems is related of the Boabab tree (Adansonia digitata) of the Cape de Verde Islands. In the year 1400, Grew cut his name on two of these trees, and in 1749 (three hundred and forty-nine years afterwards) Adanson examined the same trees and found the names, with more than three hundred layers of wood deposited over them. If we examine a transverse section of a trunk of a tree we observe, that the wood near the pith and that near the bark present very different appearances; the latter being white and soft, and more

or less juicy, and is called the *alburnum* or *sap-wood*; the former, being darker colored and hard, is called the *heart-wood*. The vessels of the alburnum are always filled with sap, and no doubt form the channel through which this fluid ascends. This is shown most conclusively in the process of girdling trees. If the sap wood is cut completely through all round, the tree dies immediately; but, if a part of this is left, the tree may linger through the summer, and perhaps longer, the continuance of life being in proportion to the amount of sap wood left uncut. In the young tree all the wood is alburnum, but as it increases in age we may notice the time in which the innermost layer is converted into heart wood. This change from alburnum to perfect wood, is no doubt occasioned in a great measure, by the deposition of foreign matter, which prevents the tissue from any longer performing vital functions, increases its density, and of course it becomes more firm and compact. The time required for the conversion of alburnum into perfect wood, differs considerably in different trees, and it is also different in trees of the same species, owing to situation; even on opposite sides of the same tree, the number of layers of alburnum is often different. In trees of the same species exposed to the same influences, the number of layers of alburnum, is remarkably uniform. In some cases there is a striking contrast in the appearance of the alburnum and perfect wood. In the Ebony, the alburnum is white, while the perfect wood is nearly black. In the Camb-wood, the alburnum is also white, and the perfect wood a deep red. There seems to be a certain fitness required in the vegetable tissues before they are capable of receiving the coloring matter, for otherwise we should suppose the change would be more gradual; but the line of demarkation is often perfect; the black external layer of the perfect wood being surrounded by a perfectly white layer of alburnum, thus showing that the transition is performed at once, and not gradually as is generally supposed. The formation of wood will more properly be noticed after the functions of leaves have been given.

48. *The pith* is the central portion of the stem commencing at its base and extending through it and through every branch, terminating in the buds. It is composed of loose cellular substance, varying considerably in size, form and appearance in different plants. In some plants it forms a large portion of the stem as in the Elder; in others but a small part, and in trees, becomes compressed into a mere line, as in the Oak. It never increases in quantity in the same part

of the stem. Its only function seems to be that of nourishing the young buds. During its early stages it is filled with fluid and performs, undoubtedly, the first vital functions; but after the young shoot has become organized so as to derive nourishment from other sources, the now useless pith becomes dry; being exhausted of its fluids and often torn and variously divided by the growth of the stem. It not unfrequently entirely decays, thus showing that it is necessary only in the early stages of the plant.

There are frequently to be found in the bark of several trees, particularly of the Beach, small conical bodies composed of wood, pith and medullary rays, which are called *nodules*. They are generally, in their early stage at least, not connected with the subjacent wood. Dutrochet believes nodules to be adventitious buds, which generally do not acquire force sufficient for their development into branches; but in some cases they do produce branches which are of a weakly character.

49. Endogenous Stems, are such as are formed by bundles of vascular tissue and woody fibre imbedded irregularly in cellular substances, and they increase by the deposition of vegetable substance internally. They differ from those above described in not having bark, pith, or medullary rays. The above definition of endogenous stems will apply in general to this division of vegetables, but there are three varieties of them, which will require our separate notice. First, such as are uniform in their structure throughout their length, and grow to be trees. We may take as a type of this structure, the *Yucca gloriosa*, or the *Chamærops palmetto*. If we make a transverse section of one of these stems, we find a cylinder of spongy substance with numerous strong, large bundles made up of woody fibre and vascular tissue imbedded in it. This cylinder is surrounded by three distinct zones. The outer one consists of the basis of the leaves which clothed the stem. Within this is a zone of cellular substance, which may be seen in fig. 16, *a*. The next zone (*b*,) is composed of materials like the liber of the bark, and they have the same arrangement. This zone is considered by Botanists as of the same construction as the internal cylinder, but we believe this is not correct, since it may be separated into layers whereas the fibres of the central part, traverse the pulpy substance in every direction, and nothing approaching a regular arrangement can be discovered. We believe

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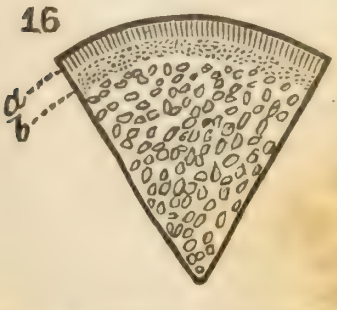
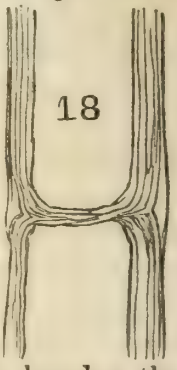


the economy of Endogenous stems, of this variety particularly, is far from being rightly understood. We have made many observations and experiments on them, and have been led to very different conclusions from those universally advanced by Botanists; but, before we would advance opinions opposed to those of all writers of the highest distinction, we would be sure that no error in observation, has led us to wrong conclusions; and we make these remarks to direct attention as far as we are able to the discovery of the true organization of these stems, and the functions of the various organs of this interesting class of vegetables. We shall content ourselves at present with describing their structure, without attempting to unfold the peculiarities of their physiological organization. If we take a part of the stem of the yucca and digest it in diluted nitric acid it will be easy to discover the arrangement of its various parts. The zone composed of the basis of the leaves will be found to consist of *fibres* proceeding from the leaves and *cellular tissue*. These fibres pass down this layer at different distances, and then pass nearly perpendicularly through the cellular and fibrous layers into the central cylinder. It is usual to describe those different layers as too closely united to be separated, but we believe the only mean by which they are united is the fibres proceeding through them from the base of the leaves; for by careful dissection after digestion in dilated nitric acid we have, by merely severing these fibres, obtained the layers perfectly separate, forming as even a surface as those of the bark and stem of Exogens, and these fibres may be traced from within the leaf to the center of the stem forming no more a part of the cellular and fibrous layers, than the medullary processes form a part of the layers of Exogenous stems. If we examine more closely the fibrous layer, we shall find it to consist of materials arranged in all respects like the liber of the bark. The fibres are interlaced in a lateral direction only, as it may be divided into thin layers, but it cannot be torn in strips. The central cylinder, as we before remarked, consists of a large quantity of cellular substance with the fibres probably proceeding from the under surface of the leaves imbedded in it. These fibres consist of spiral vessels in the center, and woody fibre surrounding them. They are arranged in no order. The central substance will split in no direction, and in making a longitudinal section, it must be cut or torn, as well as in making a transverse one. From the manner in which the new substance is deposited in Endogens, it is impossible that the stems should increase indifferently in diameter, although they are not so absolutely restricted in this respect as Botanists generally pretend. We

have seen stems of this kind increase several times their original diameter. Generally they are nearly cylindrical and the trees high, compared with their diameters, having their foliage entirely at their summit. Perhaps no circumstance strikes the beholder as more singular in a grove of these trees, than the columnar appearance of the stems, and the rich foliage of their tops, presenting an appearance of an immense arbor supported by lofty columns.

50. The second variety of Endogenous stems are such as have nodes at certain intervals, and with fistular internodes, as seen in fig. 17, which represents a transverse section of the cane, and fig. 18, a longitudinal section of a node of the same plant. The cane is a good type of this variety, which includes the grasses and grains. If we examine a cane, we find it composed of a thin, and an exceedingly hard, siliceous-like cuticle. It is generally supposed, however, that the silex lies beneath the cuticle, and does not form a part of it. By cutting into the stem, we find it composed of cellular substance with fibres imbedded in it, the fibres being more numerous, and the substance harder the nearer it is to the circumference. That part of the cylinder lying next the cavity consists almost entirely of cellular tissue. The nodes are formed by the accumulation of cellular substance between the fibres, and form a firm basis, forcing them asunder, and filling up the cavity for the attachment of leaves and branches, when circumstances induce their development. The fibres of this variety of stems are not interlaced as in the preceding, as may be seen by the splitting of the stem either into layers or strips. The leaves have their origin only at the nodes, while every part of the stem in the preceding variety becomes the origin of leaves. The nodes have been considered by some Botanists as separating the plant into as many distinct individuals as there were nodes; but there is no reason in our opinion for such a hypothesis, since we may easily trace the fibres through the nodes, and the nodes differ in no respect from any other part of the stem excepting the accumulation and hardening of cellular substance, and this apparently for the purpose of forming a situation for the leaves.



51. The third variety are such as have solid stems, and some of them with nodes, and others with branches. The smilax affords a good example of the former variety, and it approaches nearer in appearance, both by its stem and leaves,

than either of the other varieties to the exogenous stems. The herbaceous species of the Smilax and the Asparagus afford examples of branching conical Endogenous stems, and from the delicateness of the fibres and the abundance of the cellular tissue, they would hardly be recognized as belonging to this class of stems.

52. *Acrogens* are such plants as increase by the elongation of their axis without increasing in diameter. The Ferns present a type of this class of stems. While the Exogens increase by external layers, and Endogens by internal deposition, these seem to increase, as the term Acrogens indicates, by additions to their summit, that is, by the simple elongation of their parts. By examining the stem of a Fern we find it composed of cellular substance, and vessels generally bearing in some species a very close resemblance to a variety of spiral vessels, but more observations are necessary to determine the true constitution of this class of plants. There is another variety of formation of Acrogens sometimes called the *centrifugal* formation, as exhibited by fungi and lichens, in which the formation proceeds from a center, the substance being generated nearly upon the same plan. Lichens may often be seen with their centers dead, while the circumference is alive and growing. Fairy rings are the result of this formation.

Section IV.—*Root.*

53. The root is that part of the axis of the plant, which descends in its elongation, and is the organ through which the plant receives most of its nourishment, and by which it is attached to the place of its growth. The root in its general appearance resembles the stem; and when taken together they have been, not unaptly, compared to two cones united by their bases. Both taking their origin from the same vital points, and under the influence of the vital power they seem to be endowed with opposite propensities, one growing upwards, seeking light and air, the other with an equal impulse forcing its way downwards and burying itself in the earth. We may consider the plant as endowed with opposite polarities. One pole uniformly taking the direction of gravity, the other as uniformly the opposite direction. The surface of the earth may, in general, be considered the equator of this living magnet, and the zenith and nadir its poles.

Although we speak of Root and Stem being joined at a point called the neck, still there is no line of demarcation

drawn by nature by which we may determine the precise point where the stem ends and the root begins. The fibres extend from one to the other, and the union is made by a gradual conversion of the one into the other. The seat of vitality has been supposed to be in the neck, but numerous examples will readily occur to the student disproving such a hypothesis. The neck in many plants may be removed and the roots and stems will still survive by proper attention; proving not only that the neck is not the seat of vitality, but that there is no such single point which if destroyed, the plant necessarily perishes.

The principal differences between the root and stem are, 1st, that the root is destitute of pith, and 2d, the true spiral vessels are not developed in it; 3d, there are generally no regular buds formed on the roots; yet they are capable of putting them forth under favorable circumstances, as may be seen in the shoots that spring from the roots of the Peach, Plumb, Cherry, and Poplar; 4th, Stomates are not found in the bark of the roots.

In other respects the root does not differ from the stem, and we have no doubt that the differences above noticed are in a great degree owing to the situation of the root. The moist, resisting medium in which it is placed produces the variation rather than any real difference of organization. Stems when exposed to different influences change their type of organization to fit themselves to the different circumstances in which they are placed.

The most important distinction on which our idea of the root and stem should be founded, is contained in the first part of our definition, that the root is the descending part of the axis of a plant. If it descends it is a root, and if it ascends it is a stem; we mean, of course, when they meet with no physical impediment.

54. The forms of roots are various, and receive different names in the descriptions of plants, which it will be our next object to point out and explain. Although various divisions have been made by different Botanists, yet great discrepancy exist among them. We shall describe those only, which we think most important, and the most common forms.

19

1st. *Branching Root*, or *Radix ramosa*. Fig. 19. These roots are such as subdivide in the earth in a manner

similar to the divisions of the stem, and are found exhibited in the forest trees and shrubs. This variety forms the true type of roots; and is the one from which our ideas of this organ are formed, as distinguishing it from the other organs of the plant.

20

2nd. The *Fibrous Root* or *Radix fibrosa*. This variety consists of numerous fibres proceeding from the neck of the plant, and may be seen in most grasses and grains. Fig. 20.

3rd. *Fasciculated roots.* When the fibres of roots become enlarged by the deposition of starch, they form this variety of root as is exhibited by the Dahlia, Pæony, &c. fig. 21.

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4. The *Tap root*, or *conical root*, when the root sinks perpendicularly into the earth, and tapers regularly from the base to the apex with very few fibrous radicles, as in the Beet, Parsnip, &c., Fig. 22. This variety contains some of the most important garden vegetables, and it is seldom found of natural growth, being almost uniformly produced by cultivation.

5. The *Fusiform Root*, or *Radix fusiformis*, where the root tapers toward each extremity, as seen in the Radish, it is known by the above name. Fig. 23.

23

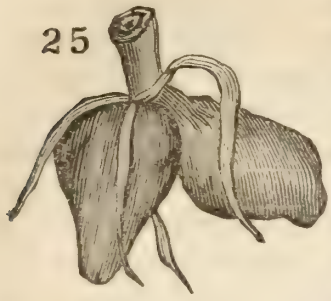
6. The *Napiform Root* is that variety which is very large at the base, but tapers abruptly as in the turnip, Fig. 24.

24

The three preceding varieties are generally called in distinction from the other varieties, simple roots, the most of the root being confined to the main axis, and sending off few small fibres.

7. The *Filiform Root* consists of a single filament, and is the root of some floating plants, as the Lemna.

8. *Didymous Roots* are those which produce a tubercle each year, and when the tubercle of one year arrives at nearly the dimensions of the one of the preceding year, they answer to the form indicated by the term applied to them; that is, double or twin roots. The Orchis affords examples of this variety, Fig. 25.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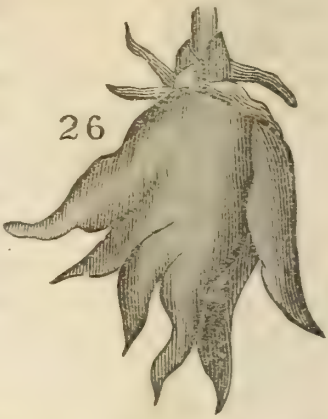
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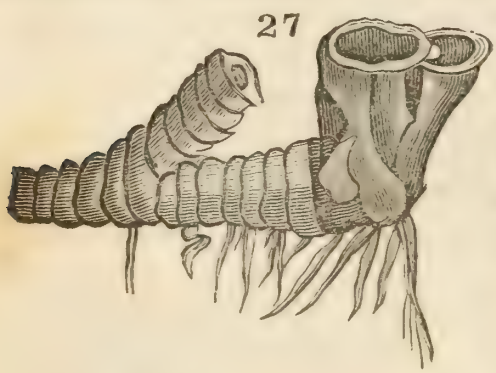
9. The *Palmated Roots* are such as differ from the preceding only in having the lobes divided, giving them somewhat the appearance of a hand. The Orchis affords examples of this variety, Fig. 26.

The following varieties are generally classed as either stems or buds, but are, in common parlance, called roots, and we know of no disadvantage in complying with the popular arrangement by describing them under this organ.

10. The *Rhizoma* or *Rootstock* grows in nearly a horizontal direction, emitting roots from its under side, increasing by one extremity only, at which it puts forth leaves and flower-stems, and gradually dying at the other. Its surface is generally marked by irregular ridges formed by the bases of decayed leaves. The Calamus, Iris, Lily, and some of the grasses afford good examples of this variety, Fig. 27. The scaly roots come under the same variety, as is exhibited in the Hydrophyllum canadense.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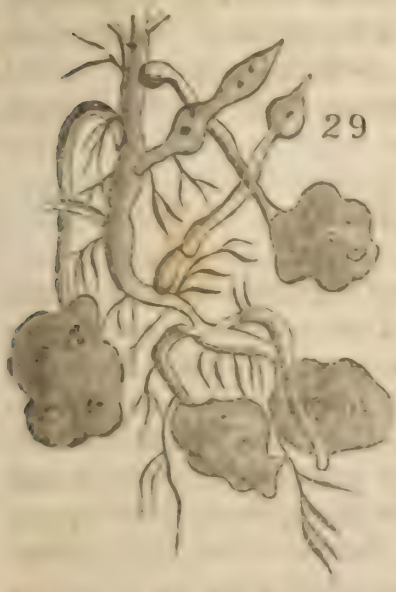
11. The *Carmus* Fig. 28. is that variety which increases beneath the earth by the development of buds in the axils of the scales, but retains its globular figure, and propagates itself in no particular direction. The Tulip, Arum, Gladiolus, &c. afford examples.

12. The *tuber* is an irregular fleshy body produced at the ends of the fibres sent out from the root. They consist in the potatoe, which is the best example of this variety, of buds, imbedded in cellular substance consisting principally of starch, which is to become the food for the development of the buds. The buds are what are commonly called the eyes of the potatoe, and they form that part of it which is used by the farmer for propagating this useful vegetable. Fig. 29 represents the form and general arrangement of tubers.



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55. It is not unfrequently the case that variations from the above types occur; but the student will readily, by carefully observing the above definitions, determine to which they belong.

13. The *bulb*, is a leaf bud enclosed in scales or concentric layers, and is found either at the base or summit of the stem, or in the axils of the leaves; and differs in no respect from the buds hereafter to be described, but in separating itself from the parent and forming an independent individual. The Onion and Lily form examples of this variety. Fig. 30, gives an illustration of the bulb. The tree onion, as it is called, bears bulbs on the summit of its stem. The buttons, as gardeners term them, are of this character. Some species of the lily bear them in the axils of the leaves, and they separate from the stem and fall to the earth, and become plants bearing bulbs in their turn. Bulbs are sometimes distinguished into *scaly*, being covered with scales as in the lily, and tunicated, being formed of concentric coats, as in the onion.

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56. At the extremities and sides of the fibres of roots, small bodies are observed composed of lax cellular tissue, called *spongioles* from their resemblance to sponge, (see fig. 31.) It is through the spongioles that all the nourishment of the plant enters, that enters by the root. Duhamel, a long time since, observed that trees ex-

haust the soil at the extremities of the roots only, but it was reserved for Sennebier to demonstrate by a very simple experiment, that the spongioles alone absorbed fluids from the earth. This he did by taking two carrots of equal size, and immersed the whole of one in water, and the extremities of the roots of another, and he found, that they both absorbed an equal quantity; but by immersing the whole body of a third, keeping only the spongioles out of the water, none of the fluid was absorbed. When the spongiole is destitute of fluid, it contracts, and lies close to the fibre to which it is attached, and hence is not easily discovered in pulling up a root; but by immersing it in a tumbler of water, they become turgid, and are easily observed.

Section 5.—*Buds.*

55. In the axil of the leaf of an exogenous tree or shrub, we may observe in the early part of the summer a small protuberance, which will continue to increase until autumn; when it will have assumed the form of a conical body composed apparently of scales. This is the *bud* which is destined in the following year to produce a branch, or flowers and fruit These small bodies found in the axils of leaves, are vital points, in which seems to be deposited the vital power during the season of repose, and from which development commences as the season of vegetation returns. That they are important organs, and demand our strictest observation, will be apparent from the fact of their being, in many instances in the vegetable economy, the seat of vitality; and it is from this circumstance, that we are enabled to divide individual trees indefinitely by grafting, budding, and by layers. The *Leaf Bud* may be defined to be the rudiment of a branch, which in its development it always produces. Buds are distinguished by different names, according to the point from which they spring. If they originate in the axils of the leaves they are called REGULAR; if from any other part of the plant they are called ADVENTITIOUS.

The *regular*, or *leaf bud* has its origin in the pith and medullary sheath. The earliest view of the regular leaf bud, we can obtain by dissection, is in the form of an exceedingly minute green body surrounded by a nearly transparent cellular substance situated in the stem immediately below the axil of the leaf. If we examine the buds of the same tree through the season, we shall find that the cellular part becomes opaque, and its place is occupied by scales, and the central

part increases and becomes the apex of the bud, and by a longitudinal section of the bud and stem at this stage, the rudiment of a branch may be distinctly traced under the microscope; the greenish medullary sheath and pith being separated by a white deposit from the greenish portion, which is to become the bark. There is a bud on the extremity of the branch called the *terminal bud*, similarly constituted to the axilary ones above described. The scales, by which the rudimentary branch is enclosed, appear to be formed for this express purpose, but they are indurated, partially developed leaves, as one may readily convince himself by taking in the spring the bud of the Buckeye, and he will find the outer scale hard, dry, and with a uniform margin, but by removing one after another he will find them gradually becoming soft, delicate, and lobed, being the miniature leaves of the plant. The leaves first developed are sacrificed for the protection of the remainder during the cold of winter. Plants of the torrid zone and annuals have no such covering, as from the nature of the case they need none. The *one* growing in a climate where the cold of winter is not felt, the other existing only through a period favorable for vegetation. The buds are not only enclosed in scales, but they are often provided with means which render their covering much more effectual in resisting outward influences. A resin is not unfrequently secreted by which the scales are attached to each other, and rendered proof against the action of water, as in the Balm of Gilead, and Poplars, &c. In others a coating of soft down is produced on the surface of the scales, which affords an additional protection in the colds of winter, as in the Willow, and many others.

56. Buds, we remarked, were the rudiments of branches, but it sometimes happens from some cause that these branches are not developed at all; at others, they are only partly developed, receiving a check in their growth, and becoming thorns and spines. The student may readily convince himself of the fact, that thorns are partially developed branches, by observing almost any thorny bush at different times. The Plumb often presents striking examples of it, on which the student may find the branch in every state of development, and the thorn of one year may receive an additional impulse the next, and become a branch.

57. Since the development of buds produces branches, it is plain that the arrangement of branches will be the same as that of buds; and as buds have their origin at the base of leaves, it is equally plain, that the branches of trees follow

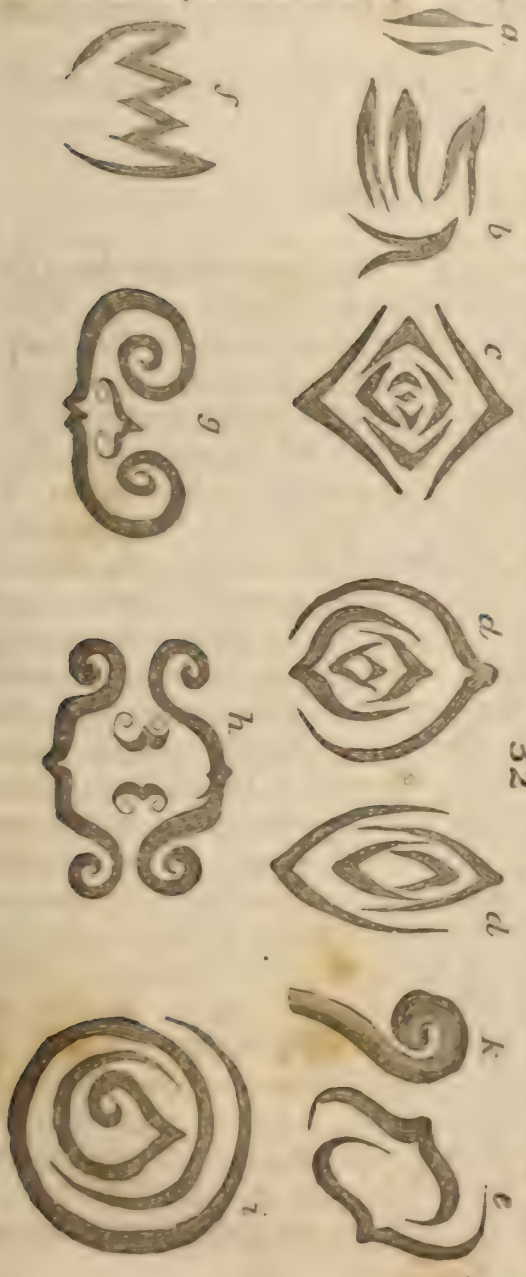
the same arrangement as the leaves. If the leaves be alternate, the branches will be so; if opposite, the branches will have the same arrangement. It happens, however, that by the nondevelopment of some of the buds, or unequal elongation of the stem, the branches exhibit some diversity; but the reason for any deviation may readily be seen, having as they will, their foundation in the above facts.

58. *Adventitious buds* may have their origin in any point where there is an anastamosis of woody fibre. (*Lindley.*) Perhaps no subject in Botany has excited more interest, or has more completely eluded the research of philosophers than the origin of adventitious buds. It is entirely removed from our observation. Every part of a plant from the root to the flowers seems to be endowed with the power, under certain circumstances, of developing buds; yet to determine the conditions on which their development depends, has as yet, baffled every effort. I have now before me a plant of the Bryophyllum, (a present from A. W. Hammond, Esq.) and from a fallen leaf of which, there are putting forth ten buds from the angles of the serratures of the leaf. The leaf lies as it fell upon the moist soil in its natural position as to surface. Duhamel supposed that they had their origin from preorganized germs, which are deposited by the proper juice in its descent from the leaves, and of course pervade every part of the plant. This is mere hypothesis with not a fact to establish its truth, and as Mr. Nuttall remarks it is impossible to prove its falsity. Mr. Knight believed, that they have their origin in the alburnous vessels, which he supposed possessed the power of generating central vessels, by which he means vessels of the medullary sheath. His hypothesis is founded on no better basis than that of Duhamel. Mr. Nuttall believes, that buds are preorganized germs, but that they have their origin in the first development of the stem or branch on which they put forth. There are decided objections to this theory, but our space forbids our entering into a discussion on the subject or even fully stating the theories alluded to.

59. The structure of the adventitions buds is, in all respects like the normal or axilary buds, having pith in their center surrounded by spiral vessels and enclosed by woody fibre and cellular integument. From the existence of spiral vessels in adventitious buds which arise from the root, it seems to us a very strong argument in favor of the existence of spiral vessels in this organ under a very slightly modified form; and from this and various other circumstances, we are led to believe that the constitution of the root and the stem

are essentially the same, the difference observed being occasioned by the medium in which they are developed. We have seen the common red plum in the loose earth of a garden put forth buds from a root with as much regularity as from the branches.

The buds seem to possess in some respects the nature of seeds, although in others they differ. The seed produces the species or original type, while the bud perpetuates the variety; hence the practice of grafting choice fruit. The bud will continue the characters of the individual variety, while the seed would produce merely the species, with perhaps none of the peculiarities of the plant from the fruit of which the seed was taken.



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60. The *manner*, in which the rudimentary leaves are folded up within the buds, is a subject of much curiosity and interest. Although the arrangement in different plants is very unlike, yet in the same species there is a remarkable uniformity. This subject has been termed, *vernation*, or *germation*, or *prefoliation*.

1. *Appressed*; in which the surfaces of the leaves are applied to each other without being rolled, as in the Misseltoe, fig. 32, *a*.

2. *Conduplicate*; when the leaves are folded inwardly upon themselves & placed side by side as in the rose, fig. 32, *b*.

3. *Imbricate*; where they lie over each other, breaking joints, if we may use the expression, that is, when the middle of one leaf corresponds to the margin of the two within it, as in the Lilac, *c*.

4. *Equitant;* when the leaves are folded around each other with the midrib, of one corresponding to the margin of the one contiguous to it as in the Iris, *d.*

5. *Obvolute;* when one margin of a leaf encloses the margin of a leaf opposite, and the remaining margin of each being outward, as in the sage, *e.*

6. *Plaited;* folded like a fan, as in the vine, *f.*

7. *Involute;* when the margins of the leaves rolled inwards as in the violet, *g.*

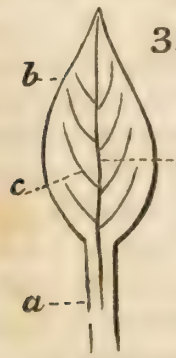
8. *Revolute;* where the margins are rolled outwards, as in the willow, *h.*

9. *Convolute;* where one leaf is rolled within another, as in the cherry, *i.*

10. *Cercinnate;* where it is rolled from the apex downwards as in the sundew, (Drosera) *k.*

Section 6.—*Leaves.*

61. *Leaves* are organs arising at regular intervals along the main axis or branches, having their origin at a node. They are expansions of the parenchymous portion of the bark, with the spiral vessels and woody fibre of the medullary sheath traversing it. The leaves are connected to the center of the stem by the woody fibre, spiral vessels on the one hand, and with the bark by the parenchymous portion on the other. A leaf consists generally of a petiole and lamina. The *petiole*, which is the support of the lamina, (fig. 33, *a*)



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consists of cellular and vascular tissue, and woody fibre. The vascular tissue and woody fibre are formed into bundles, the spiral vessels occupying the center of the bundle, and the woody fibre, forming a sheath around them. The bundles are imbedded in the cellular tissue, as may easily be seen by observing a transverse section of the petiole of a leaf. The dots observed on the cut surface are these bundles.—The *lamina* (fig. 33, *b*) of the leaf consists of the expansion of the petiole, the materials of its composition being of course, the same, but differently arranged. When the bundles of vascular tissue enter the lamina, they divide and proceed in various directions in different plants, but always in the same manner in the same species, forming the veins (fig. 33, *c*) of the leaves. The continuation of the petiole forms the middle and largest vein of the leaf, called the *midrib*, (fig. 33 *d.*) Those veins arising from the midrib are called *primary*, the

branches of the primary are called *secondary*, and the further subdivisions of the veins are called *veinlits*.

Every leaf is by no means constructed with all the above parts. The petiole is often wanting, when the leaf is said to be *sessile* and the midrib is often undistinguishable from the veins, but the above gives the general type of leaves and the variations will be noticed in their proper places.

61. The arrangement of the leaves on the stem is various but in the same species it is uniform; a beautiful symmetry is established in every variety. Sometimes they are arranged in opposite pairs, with one pair at right angles with the pair above or below it; at others they alternate, with one above the other, on nearly opposite sides of the stem. The alternate leaves, however, are generally arranged in a spiral form. They are not on exactly opposite sides of the stem. The student will observe, that by taking any leaf on a branch on which the leaves are arranged alternately, he will notice the second leaf above or below the one observed, does not come *immediately* above or below it; but he must pass several pairs before he will find one corresponding exactly with the one first noticed. On the cherry, or Althea, for instance, he will pass two pairs before he will find one exactly over the one observed, here two turns of the spire take place before the generating point corresponds with the one below it. Opposite leaves sometimes become alternate, but we believe, that they are always exactly on the opposite parts of the stem, never forming the spiral arrangement of common alternate leaves; and the cause of this alternation is undoubtedly the unequal development of the two sides of the stem. It sometimes happens that several opposite pairs are developed on the same horizontal section of the stem and are called *verticilate*, but the basis of the leaves of any *whorl* are not immediately under the basis of the leaves of the next *whorl* above it, but those of the second whorl correspond with them, so that of four whorls the basis of the first and third correspond, and the second and fourth and so on. The Pine presents a striking example of the spiral arrangement of organs. If we examine the extremity of a branch covered with leaves, we shall readily discover, that they are arranged spirally; and by cutting off the leaves composing one spire, we shall find, that they do not form a single spire, but a compound one consisting of three or four spires running parallel to each other. The above are the different arrangements of leaves, but there seems a tendency in opposite and verticilate leaves to assume the spiral arrangement, without, however, varying

their relative lateral position; and this is true of all modification of leaves. Did we know, what concurrent circumstances were required for the development of a leaf, we might then perhaps find a reason for these variations. But there is not only a disposition of the leaves, but of all vegetable productions to assume a spiral arrangement. The stems of plants take, in almost all cases, more or less of the spiral growth however straight the stem may be. We may see this also in the epidermis of various trees and more particularly in the stems of twining plants as the hop and ivy.

The spiral arrangement of leaves has excited much interest recently; and Braun, a German Naturalist has applied Mathematical formula to express the elements of the spires in different species, and for determining their constitution. The most simple parts only of his memoir are admissable to an elementary work, and we shall state a few of his principles as quoted by Lindley. "All the spires depend upon the position of a fundamental series, from which the others are deviations. The nature of the fundamental series is expressed by a fraction, of which the numerator indicates the whole number of turns required to complete one spire, and the denominator the number of scales or parts that constitute it. Thus 8-21 indicates that eight turns are made round the axis before any scale or part is exactly vertical to that, which was first formed, and the number of scales or parts that intervene before this coincidence takes place is 21," which occurs in the Corylus, Plantago lanceolata. 2-5 expresses that the leaves, buds or scales make two turns, before a leaf, scale, or bud is exactly above the one from which we start and that there are five of them. This is the most common variety. Cherry, Althea, Potatoe, Peach, &c. are of this variety. $\frac{1}{2}$ includes the spikes of the grains. 3-8 includes the Bay, Holly, &c. Prof. Lindly remarks that, "it does not, however, appear that this enquiry has led to any thing beyond the establishment of the fact that beginning from the cotyledons the whole of the appendages of the axis of plants—leaves, calyx, corolla, stamens and carpels—form an uninterrupted spire, governed by laws which are nearly constant."

Conjectures have been made, as to the cause of the uniform arrangement of leaves on the stem, and why they take one form in any given species rather than another, but they are so completely conjectural that we shall not occupy space in stating them. Our own observations have not afforded us the least clue to the solution of the problem.

62. Leaves usually present surfaces of different appearance,

the upper, smooth, green and shining, the under surface generally with the ribs prominent, of a lighter green, often hairy, and abounding in stomas or pores. The particular position, which a leaf assumes, is necessary to its properly performing its functions, and even to its existence; for if a leaf be inverted it withers and dies. The deeper tint, of the upper surface of leaves, is supposed to be owing to the greater compactness of the parenchyma.

63. The first organs, that appear in dicotyledons after germination, are the cotyledons themselves, or the lobes of the seed, which supply the young plant with food, till it becomes furnished with organs for obtaining it from other sources. Before the cotyledons become exhausted, leaves are produced, which are called *seminal* or seed leaves, which are capable in some degree of elaborating the sap drawn up by the roots. Next come the Primordial leaves which seem to possess an organization a degree more elevated. These leaves often differ materially from the succeeding true leaves of the plant, and seem to form a kind of medium between the cotyledon and true leaves. A similar course is followed by Monocotyledons but as the cotyledon does not arise above the earth, this organ is not observed. When leaves have their origin at, or below the surface of the earth, seeming to come from the root, they are called *radical leaves*, although it is not strictly a correct term; as it seems to imply, that the leaves originate from the root, which is not the case, the root under ordinary circumstances not producing leaves. Leaves having their origin on the main stem, are called *Cauline*; those arising from branches are distinguished by the term, *ramal*; when leaves are found among the flowers or on flower bearing branches, they are called *floral leaves*.

64. The structure of the leaf demands our careful attention, both from the singularly curious arrangement of its parts and the manifest design exhibited in fitting it for the various functions, it is found to perform. Although to the common observer the leaf appears a very simple organ, composed of simple fibrous veins, and cellular substance; yet by the aid of the microscope it is found to be one of the most complicated of the vegetable organs. The leaf is covered like the other parts of the plant by a cuticle, except such as are submerged in water, and is furnished with pores or stomates. These pores in most plants, are more numerous on the under, than on the upper surface. In leaves which grow nearly perpendicularly, the pores are more equally distributed on both surfaces, as in the Iris. Those leaves which lie upon the water, have no pores on

the under surface; the upper surface performing the functions usually belonging to the under side. The Parenchyma appears to the unassisted eye a mass of irregularly arranged cells, but by careful examination, aided by the microscope, we find a remarkable regularity in the arrangement of the cells. If we take a thin slice, made by a vertical section of the leaf of an Apple or Peach tree, and observe it by a good magnifier we shall find that immediately beneath the cuticle which consists of a single row of cells, two or three layers of cylindrical cells arranged perpendicularly to the surface, with very small intercellular cavities. Between them and the under surface are four or five rows of similar cells, but differently arranged touching each other by their ends and lying inclined to the surface of the leaf forming comparatively large cavities, particularly immediately beneath the stomates. Fig. 34, *a*, exhibits a type of the arrangement of dicotyledons.

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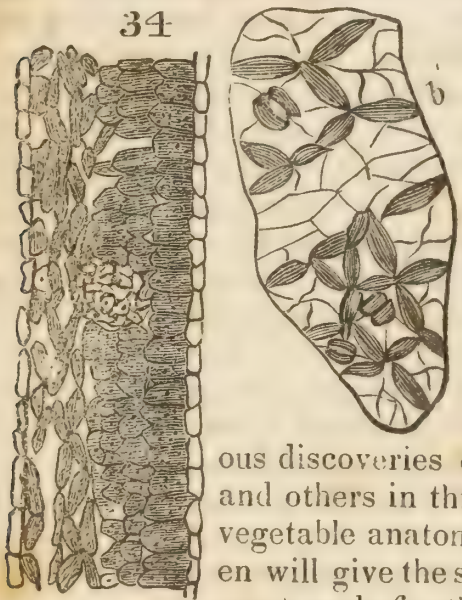

That side of the leaf which is furnished with stomates being cavernous, and the opposite side more compact. Those leaves, which have the stomates equally distributed on both surfaces, and those also which have no stomates, have cells of the parenchyma of the two surfaces similarly arranged. Our space forbids our recording here the numerous discoveries of Mirbel, Mohl, Brongniart and others in this interesting department of vegetable anatomy. The example above given will give the student an idea of the arrangement made for the purposes of digestion, respiration and perspiration in the plant, which functions we shall notice in another place.

65. The veins of the leaf, which ramify in every direction through the Parenchyma, are composed as we before observed, of vessels enclosed by a sheath of woody fibre. These veins serve two purposes, that of giving form and support to the Parenchyma and affording channels for the circulation of the sap to the various parts of the leaf, and returning it to the stem. The veins are largest where they enter the leaf, and decrease as they proceed and ramify till they are lost to our observation in the cellular tissue. There seems to be two separate venous systems in the leaf, one over the other con-

nected by the extremities of the veins, the upper one being the system, through which the sap passes into the leaf, and the lower conveys it after elaboration back into the stem. It is generally difficult and often impossible to distinguish these two systems; but by maceration, some leaves will separate into two lamina. It is recorded of an East India plant, that the cohesion of the two plates is so slight, that the lamina may be easily separated and the hand inserted between the surfaces, as in a glove.

66. The structure of the leaf seems to have been designed in direct reference to the function of elaborating the sap by eliminating a part of the water and exposing the whole to the action of the air. These processes are provided for and regulated in the most beautiful manner in the anatomy of the leaf. The leaves of trees have a general position, nearly parallel with the earth. The upper side, exposed to the direct action of the sun's rays, lest evaporation should take place too rapidly, under such circumstances, has few or no pores and the cells being of a cylindrical form are arranged with their ends towards the surface, thus presenting the least surface of each cell to the influence of the solar rays, by this arrangement limiting their influence. Here we observe three precautions taken evidently to prevent excessive evaporation. Again, those leaves whose sides are equally exposed to the action of the sun's rays, are equally furnished with these evaporating pores; the number in this case determining the evaporation. In leaves floating upon the surface of the water, it is evident, that pores on the under surface would avail nothing in evaporation, and perhaps be destructive to the organ; but the upper surface in this case, is furnished with numerous exceedingly minute pores connected with deep narrow cavities next the surface, and these are connected with larger ones in the interior so that by this arrangement evaporation can take place, but slowly. Nature using these precautions where she seems obliged to use the upper surface to perform an indispensable function, which without such precaution, would endanger the safety of the plant.

65. *Forms of Leaves.*—By the arrangement and development of the venous and parenchymous systems of leaves, every variety of form which leaves assume, may be reduced to a few very simple principles.

1. *Fork-veined* leaves are those leaves in which the primary veins divide into two, nearly equal, secondary veins, forming a fork, and these sub-divided in the same manner. The

veins always proceed directly from their origin to the margin of the leaf without forming any meshes or net work, as is exhibited by a leaflet of the Aspidium Acrurtichoides (fig. 35.) This variety of venation belongs to the ferns, and is a distinguishing characteristic of this class of plants.

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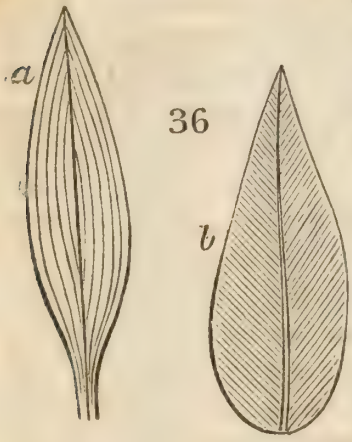
2. *Parallel veined* leaves are those in which the veins proceed from their origin to their termination without any subdivision; the veins being connected by minute, parallel, straight veinlets, passing perpendicularly from one to the other. The veins of this variety either run from the base of the leaf to the apex, as in Corn, Lily, Grains, and as seen in fig. 36, *a*; or from the midrib to the margin, as in the *Canna* and *Arum Walteri*, &c. (fig. 36, *b*.) Of this latter variety there are *comparatively* few specimens in temperate climates, becoming more abundant as we approach the equatorial regions. Parallel veined leaves are characteristic of Endogens.



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3. *Reticulated* or *netted veined* leaves are those when veins branch and ramify in all directions, and by anastimosing with each other form a complete network. This variety of leaves is characteristic of Exogenous plants, and they are the most varied in their forms, and comprise the greatest proportion of leaves of temperate climates.

From the above remarks we observe that the three great classes of vegetables are characterised by distinct modes of venation. Flowerless plants, or Acrogens, so far as they fall within this subject, are characterised by the forked veined leaves. Endogens are, with few exceptions, as in the Trillium and Smilax, distinguished by the parallel, and Exogens by the reticulated veined leaves. These are important distinctions for the student to bear in mind, as they may be of much importance to him in many cases, when all other characteristics of these divisions may be absent, or obscure at the time of examination.

67. We now proceed to point out the different varieties of simple leaves, occasioned by the course of the veins. There are two varieties of venation in the reticulated leaves, occa-

sioned by the origin of the primary veins. If the veins take their rise along the midrib and proceed to the margin, giving the leaf, in structure, a resemblance to a feather, it is called the *Feather veined*, as seen in fig. 37, which represents the leaf of the Chestnut. The form of the leaves of this variety, depends on the direction and relative length of the veins. If, as in the chestnut, the veins make an acute angle with the midrib, and proceed straight forward to the margin, the leaf is proportionally lengthened, and takes the name of *lanceolate*. If the midrib and veins near the apex are considerably elongated its apex is said to be *acuminate*. If the primary veins are short and of nearly equal length, the leaf will be narrow and elongated, and is denominated LINEAR. (fig. 38.) If the veins that proceed from the middle of the midrib are larger than those of the apex or base, it assumes the the form of fig. 39, *a*, or some similar outline, and form the varieties oblong, oval, eliptic, or in some cases approaching orbicular (fig 39, *b*.) If the veins springing from the base are larger than the rest, and proceed from the midrib at a greater angle, the leaf assumes the *oval* form, (fig. 40,) but if the reverse takes place with the veins, that is, if the veins above the middle be the longest, the shape of the leaf will be reversed and we shall have the obovate leaf. (fig. 41.) It not unfrequently happens, that the veins that originate at the base of the midrib are nearly as large as the midrib itself, and run in nearly a parallel direction with it, as in the Cornus, (fig 42.)—These are called *ribbed leaves*, and the student must be careful not to confound this variety with parallel veined leaves from which he may in most cases, ca-

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sily distinguish them by observing the net work arrangement between the ribs.—*Falsely* ribbed leaves, are those whose primary veins unite near the margin and form what appears to be a true vein, but in reality consists only of an accumulation of the extremities of the primary veins.

The other forms of simple reticulated leaves, are those which have generally no midrib distinguishable from the other veins, but the veins as they enter the lamina of the leaf radiate from their point of entrance at the margin of the leaf in every direction, and thus constitute the radiated form of reticulated leaves. The leaf of the Heuchera Americana forms a good example of this variety, (fig. 43.) It is sometimes the case that the petiole supports the lamina by being attached to its center, and the veins radiate from this point in every direction, forming the *Peltate* leaf, as exhibited in Hydrocotyle and Nasturtion, (fig. 44.) Professor Gray well remarks that the secondary veins of radiated leaves are always disposed according to the feather-veined method ; so that we may assume the latter as the type of the venation in Exogenous plants, and conceive a radiated leaf to result from the union of several feather-veined ones.

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68. The above are the most common forms assumed by leaves when the spaces between the veins are perfectly filled by the development of the Parenchyma ; but it often happens that the parenchyma is not sufficient to occupy all the frame work of the leaf, and leaves assume a great variety of forms from this cause. Let us suppose that in a leaf like the Heuchera, no more parenchymous substance had been developed than was sufficient to cover the veins themselves and we should have the leaf of the Ranunculus Panthorix, (fig. 45.) Should the leaf have the same venation as in the pre-

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ceeding case, but with the parenchyma of the secondary veins connected with that of the primary from which they originate, we shall have the *parted leaf* of the Geranium Maculatum, (fig. 46.) By a still greater development of the parenchyma we shall have the lobed leaf, as in the Liquidamber, Acer, &c. (fig. 47.)—If we take the type represented by the Nasturtion and Hydrocotyle and a development of the parenchyma only sufficient to cover the veins attached to each rib and we have the *palmate* leaf of the Podophyllum peltatum, fig. 48.) We have a striking confirmation of the above theory of the origin of lobed leaves, in the *Hydrogeton fenestralis*, a plant peculiar to the island of Madagascar. It is an aquatic plant bearing leaves having the appearance of latticework, It is a skeleton leaf, the parenchyma being only sufficient to cover the veins. The veins are fully developed and regularly arranged like other leaves of the same variety, but no parenchyma is generated to fill up the spaces between the veinlets.

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69. It not unfrequently happens, both in reticulated and parallel veined leaves, that the first veins after entering the lamina curve downwards, and if they assume afterwards the upward direction they form by these flexures the *cordate* variety of leaves, as in the Smilax (fig. 49) among the parallel veined leaves, and in some species of Poplar (fig. 50) in the reticulated. If the veins continue downwards, they form the Sagittate leaves as in the

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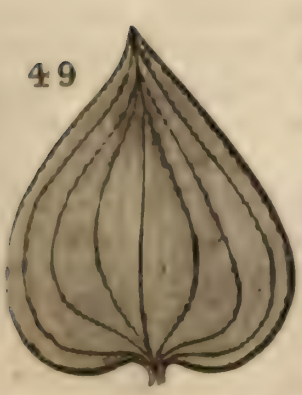

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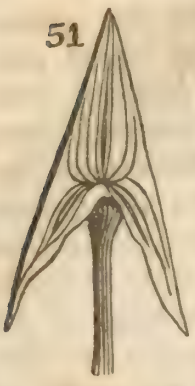
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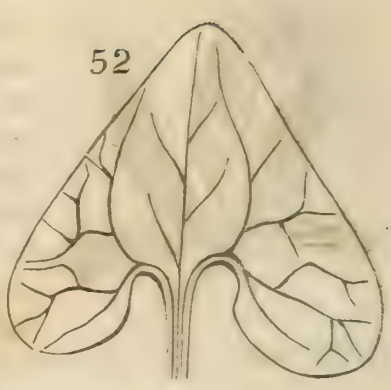
Sagittaria (fig. 51) and Asarum (fig. 52.) The former an Endogens the latter an Exogens. From the above remarks the student will readily determine the causes of every variety of form of simple leaves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which may fall under his observation ; arising, as the diversity does, either from the arrangement of the veins, or the development of the parenchyma. The non-develpment of parenchyma seems, by examination of some leaves, not to be the cause in all cases of lobed leaves, but in some instances the non development of the veins ; for the undulating margin of such leaves shows an excess of parenchymous substance, and yet the leaves are lobed. Example of this formation may be found in different varieties of the oak, as the Quercus alba, Lyrata, &c. The student will observe that the spaces between the lobes, particularly in the Lyrata, are very sparingly supplied with veins, showing that it was a want of development of veins that caused the lobed form of the leaf.

70. *Compound leaves* are those which have the lamina articulated to a common petiole ; and this fact must be borne in mind as the real distinction between simple and compound leaves. No matter how much the lamina may be divided, if the divisions are not articulated to a common petiole, the leaf is simple ; and if the lamina is not divided at all, but articulated to the petiole, the leaf is compound, as in the Orange (fig. 53.) The principle of formation of this class of leaves will be readily understood by the above explanation of simple leaves.

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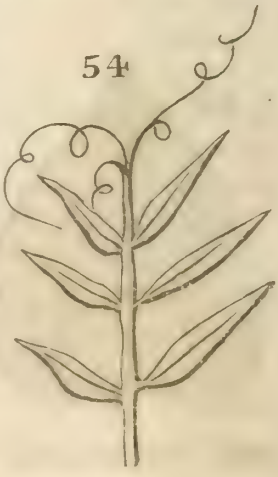
All compound leaves may be reduced to two varieties corresponding to the Feather veined and radiated forms of reticulated leaves. If we recur to the chestnut leaf given above, and conceive each of the primary veins with the secondary veins belonging to it, to form a distinct lamina, we should have a true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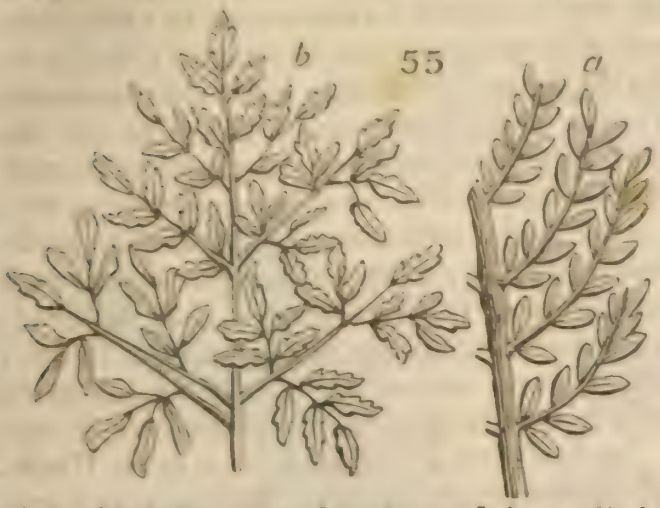
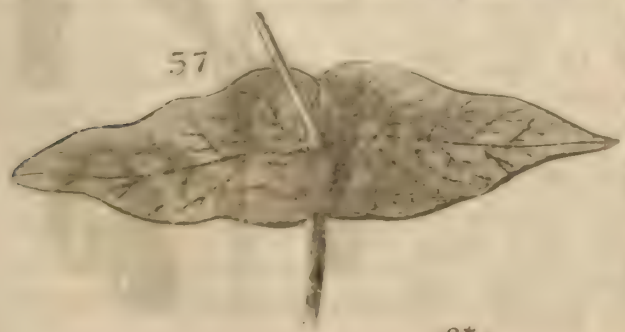
type of the *Pinnate* leaf, as exhibited in the Vicia, Pea, &c., and by the continuation of the petiole we have the *tendril*, (fig. 54,) and by continuing our supposed dissection of the chestnut and conceiving not only each primary vein as being independent of the others, but each secondary one forming a lamina, and the primary vein becoming a common petiole for them, we then shall have the type of the *bipinnate* leaf, as exhibited in fig. 55, *a*. We may conceive this division to go on still farther and form the tripinnate leaf, as in the Thalictrum, (fig. 55, *b*,) and it even exceeds this subdivision when the term *supradecompound* is applied to them, no matter how far the divisions may extend. The radiated form of reticulated leaves, often assume the compound structure, as in the Æsculus, Lupinus, Clover, &c. (fig. 56,) but the student will find no difficulty in detecting the principle on which they are constructed from the above remarks, without a description.



71. Besides the preceding varieties of leaves, which may be considered their common forms, they often assume a variety of modifications which deserve a special attention. These variations arise from a variety of causes, which will be noticed under the several examples which we shall adduce. A cohesion of parts, not unfrequently creates a variation from the usual form. The bases of the upper leaves of the *Caprifolium Sem-*



pervirens are brought in contact from the unusual development of both systems of the leaf, and they grow together, forming a *perfoliate* leaf, (fig. 57.) The same takes place in many other plants, and the occurrence differs in no respect from what happens in the production of twin apples, and other similar formations except in its uniformity, which DeCandolle denominated constant accidents. Why it should uniformly occur, and only in the upper leaves, we are unable to explain, by any secondary cause with which we are acquainted; but by examination of the leaves, we are irresistibly led to the conclusion, that the slight variation in the direction of the veins and the great development of the parenchyma are the causes of the phenomena. The other leaves are of the oval lanceolate form, with the veins forming acute angles with the midrib, but in the perfoliate leaves the veins pass off at nearly right angles with a much more abundant production of the parenchyma, thus uniformly accomplishing in this case what occasionally happens in other vegetables; perfoliate leaves occur from the same cause in the alternate varieties by the union of the lobes, of what would otherwise form a cordate leaf, as in the Uvularia perfoliata, fig. 58. But the most singular variations produced by the operation of this cause, occurs in the pitcher like leaves. Our common *Sarracena* (Side-saddle flower) is produced by the cohesion of the edges of the leaf, or as is most generally supposed of the petiole only, and the expansion at the top of the cup is thought to be the real lamina, which is probably the case, (fig. 59.) The *Nepenthes* or *Pitcher plant* of India, presents a still more striking instance of variation, and partly from the cause under consideration This singular leaf, exhibited in fig. 60, is described as arising from the stem with a round common petiole, like most other leaves, which soon expands into a lamina and afterwards becomes round, long and slender, resembling a tendril. At

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the extremity of this tendril is developed the pitcher with a lid closely fitting its orifice. The whole of this curious production, except the lid, is supposed to be the petiole which at first assumes the common form, and afterwards becomes a *Phyllodium* (as a leaf like expansion of the petiole is called,) and is succeeded by the tendril, and finally by the cohering of its edges, forms the pitcher, whose lid is the lamina of the leaf.

72. An unusual development of certain parts often produces great variations from the regular form. The petiole is the part of the leaf that experiences most frequent changes from this cause. In the Dionæa Muscipula (fig. 61,) we

find the petiole expanded into a phyllodium and terminated by the lamina bearing much less the appearance of this part of the organ than the petiole. The orange also has an expanded petiole with the lamina articulated to its extremity. We have described, by authors, foreign plants exhibiting remarkable variations from any regular type, in some of which the petiole is developed apparently at the expense of the lamina, which is either entirely wanting or but imperfectly developed. The leaves of the onion are supposed to be a development of the petiole with no lamina, and many of the leaves of the Endogens are supposed to be of the same nature, as the Iris, Calamus, &c. The excessive development of the cellular substance in leaves, often causes great diversity in appearance as in the various species of the Mesembryanthemums, (Ice plant,) this cause operates to produce the singular forms observed in the different species of this genus. In the Begonia, the parenchymous development on one side of the midrib is

much greater than on the other, thus producing the oblique or one sided leaf, (fig. 62.)

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A want of development and hardening of the parts often produces deviations from the usual forms. The existence of spines at the extremities of the lobes of the Holly, is owing to these causes, and in some radiated leaves the veins seem to be converted unto spines, and in a species of the *Prosopis* "one half of the leaflets contract into a spine while the other half remains leafy. But the most singular instance of this kind of deviation occurs in a palm called the *Desmoncus*, in which the upper leaflets of its pinnated leaves contract and curve into scythe shaped hooks by which the desmoncus climbs, while the lower leaflets retain the usual appearance of leaves."

73. The Petiole is sometimes entirely wanting, but at others excessively developed. In sessile leaves it is absent, but in the *Nymphæa odorata*, a *water lily*, it is even six or eight feet long. In the Palm, Palmetto and other tropical plants, it is much longer, and assumes more the appearance of a branch than a petiole. The lamina varies also from the size of the minute scale-like leaves of the Moss to prodigious dimensions on some tropical leaves. These organs in general bear no proportions in size to the plants on which they are found.—On some species of the Oak, of the most sturdy kind, the leaves are small, but feebly corresponding with the gigantic tree itself, while the leaves of the Rheum Rhaponticum (Pie plant,) are exceedingly large, the plant itself, divested of its leaves, is comparatively, in size, an insignificant plant.

74. The duration of leaves is various. In some they fall almost as soon as developed, and are then said to be *fugacious*, at others they remain till the end of the summer and fall with the cessation of vegetation, when they are called *caducous*. In others they remain during the winter, and are denominated *persistent*, and produce the various evergreens of our forest. Various hypotheses have been formed to account for the fall of the leaf, but the most satisfactory one to our mind, is that given by Professor Lindly, which is, that while the stem and leaf are both increasing in size, there is an exact adaptation of the base of the leaf to the stem and no interruption takes place; but when the leaf becomes perfectly developed and is susceptible of no further increase, the stem continues to en large by the deposition of new matter from the leaves above, which breaks the joining vessels, and the leaf of course falls. The breaking of the vessels may be easily observed in the

leaves of the Magnolia Heterophylla, hence the reason for the fall of leaves on the lower part of a stem first. It would seem from the above, that the duration of leaves depends upon the time that they are capable of adapting themselves to the stem on which they grow. Some can exist only for a few days, others through the summer, while the evergreens are so constructed as not to be dislodged but by the growth of the wood of the succeeding year.

Section 7.—*Stipules and Tendrils.*

75. At the base of many leaves we meet with two leaf-like organs, separated by the substance of the base of the petiole, which are called *Stipules*. Stipules frequently fall off upon the development of the leaf, when they are called CADUCOUS, at others they remain as long as the leaf, and are called PERSISTENT. In the former they are attached only by their base to the stem, in the latter they are connected with the petiole and fall only with it. In opposite leaved plants the stipules corresponding to the two leaves are generally united, forming but two stipules instead of four. The hop affords an example of this kind. The stipules are in many respects analogous to leaves, and even have buds in their axils, as in the Peach, and in some instances are very much like them in appearance, as in the Pea. (fig. 63.) In others they bear no resemblance to the leaves but are simple membranous appendages, as in the *Hickory*, or fine bristles as in the Cherry. They assume a great variety of appearances, by various modifications of structure and attachment. In the rose they are attached to the petiole forming a leaf-like margin to that organ. In the Polygonum and Rhubarb they form a sheath round the stem by the union of their edges, and are then called OCHREÆ, (fig. 64.) In some plants they become hardened and conical and form spines. In climbing plants they often lengthen into a slender thread-like appendage, and become the organ by which the plant attaches itself to objects over which it climbs, thus forming for the plant the means of support. But however various may be their appearances, and however unlike in structure, yet if they originate from the base of a leaf they are stipules.

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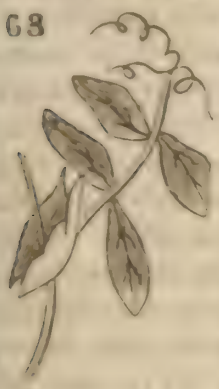

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76. *Tendrils* are thread-like organs by which the plant attaches itself to neighboring objects. Whatever may be their origin, if they correspond to the above definition, they are denominated tendrils. In some plants they are modifications of branches, as in the Vine, in others they are the extension of the midrib of the leaf, as in the Vicia and Pea, in others modifications of the Stipule, as above noticed. 'Tis said that the petals sometimes become tendrils and support the plant, as in the genus Strophanthes, an African plant.

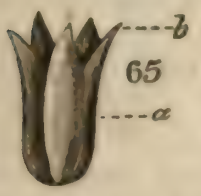
CHAPTER III.

77. The *Organs of Reproduction* compose the *flower*, which consists generally of the *Calyx, Corolla, Stamens and Pistils.* Although all of these organs enter into the composition of most flowers, yet it is by no means necessary, that they should all be present. A *perfect flower* is one that has stamens and pistils, without reference to the presence of the calyx or corolla. When these latter organs are wanting and the stamens and pistils have no envelops the flowers are said to be *achlamydeous* or destitute of covering, as the word signifies, at others they have a single envelop and are said to be *monochlamydeous*, or having a single covering and this envelop is called the *calyx ;* at other times, they have a double envelop and are called *dichlamydeous*, or having a double covering, in this last case the outer envelop is called the calyx, and the inner the *corolla.* By strictly adhering to the above definitions, all flowers, which do not have a double envelop, have no corollas whatever may be the appearance of the envelop which is present. The Lily, Anemone and many other showy flowers, have correctly speaking no corolla. It is not unfrequently the case, that there are several rows of envelops and so nearly of the same constitution and appearance as to be undistinguishable from each other, in such cases the calyx and corolla are said to be *confounded*, that is, they cannot be distinguished as in the Calycanthus and the whole is called in such cases a *perianth.*

78. The word *calyx* is derived from a Greek word (*calux,*) which signifies a covering, and is a generic term applied to designate every form of the external envelop which surrounds the stamens and pistils. The general distinguishing characteristics of the calyx are : that it is the outer covering of the flower, green, smaller than the corolla more firmly attached

to the plant, and having more the appearance of leaves. Although the above may be considered as designating this organ in most plants, yet there are numerous exceptions to it. The first part of the definition, that it is the outer covering, is the only characteristic that never varies. It is sometimes even more brilliant in its colors, and larger than the corolla itself, and instead of being more permanent, in some species of plant, it falls even before the corolla expands, but these are exceptions to a general fact.

79. When the calyx consists of a single piece it is said to be *gamosepalous*, a term invented to indicate the union of several sepals in forming the calyx. When it is composed of several distinct leaves, it is called *Polysepalous*. In the gamosepalous calyx, that portion formed by the union of the sepals is called the tube fig. 65, *a* the expansion at the top (*b*) is called the limb. If the calyx takes its rise below the ovary or seed vessel, it is said to be inferior, if from the summit of the ovary, it is said to be superior. The origin of the calyx in both cases is undoubtedly the same, that is, from beneath the ovary; but in the superior calyx it becomes firmly united to the ovary and forms a part of it, as in the Apple. The Rose and a few other plants form exceptions to the above, as what appears to be the cup-like calyx of the Rose is now considered, and correctly too, as an expansion or hollowing out of the summit of the pedicel, in which the calyx is situated.



80. *Corolla.*—As we above remarked, when there are two whorls of floral envelops, the interior is called the *Corolla*. The divisions of the corolla are always alternate with those of the calyx, a necessary consequence of the law laid down in par. 76, that the bases of contiguous whorls of leaves are alternate. The individual leaves of which the corolla is composed are called *petals*, and if the petals are united by their margins forming a *tube*, the corolla is said to be *gamopetalous*, if they are distinct it is called *polypetalous*.—The orifice of the tube is called the *throat*.

81. The forms assumed by *gamopetalous* corollas are various and have received characteristic names, the principal of which are the following:

1. *Rotate* having a very short tube with a spreading limb, as in fig. 66.

2. *Hypocrateriform*, with a border like the preceding, but with a long tube, (fig. 67.)

3. *Infundibuliform*, (fig. 68,) or *Funnel shaped*, having a regularly expanding tube, as in the Convolvulus.

4. *Campanulate* (fig. 69) with the tube swelling at the base and then gradually expanding into a limb.

5. *Labiate.* When the corolla is separated into two unequal divisions called the anterior, or lower and posterior or upper lips, (fig.70,) as in the Mint. The *Personate* corolla differs from the Labiate only in having the throat closed by a projection of the lower lip (fig. 71.)

6. *Urceolate* or *pitcher-shaped*, the same as campanulate, but with the orifice contracted and an erect limb (fig. 72.)

Many other terms have been applied to various modifications of forms of the gamopetalous corolla, but our space forbids our extending the list beyond the most common and therefore most important forms.

82. In *Polypetalous Corollas* each petal consists of a *limb* or *lamina* and *unguis* or *claw*. The *claw* is the narrow part of the petal by which it is attached to its support, and corresponds to that part in the gamopetalous corolla, which forms the tube and is the petiole of the leaf. The *limb* is the dilated portion of the petal supported by the claw, and is the lamina of the leaf. The claw is not always present; when it is present the petal is said to be *unguiculate*.

83. The terms applied to the different forms of the polypetolous corolla, are

1. *Rosaceous* when there are several spreading petals without claws as in the Rose or Apple, (fig. 73.)

2. *Lilliaceous* when the petals stand side by side with the claw

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gradually expanding into a limb, (fig. 74.)

3. *Caryophillous*, with long slender claws protected by a tubular calyx with an expanding limb, as in the Pink (fig. 75) When the claws are short the flowers are called *alsinaceous*.

75

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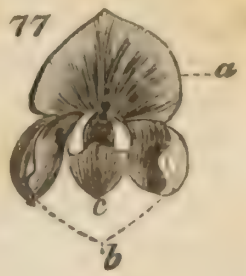


4. *Cruciform* are such as consist of 4 petals arranged opposite, or at right angles to each other, as the Turnip, Cabbage, &c. (fig. 76.)

5. *Papilionaceous* consist of 5 petals of which the upper is erect, more dilated than the others, and is called the *vexillum*, (77, *a*,) the two lateral are at right angles with the vexillum and of course parallel with each other and are called the *wings* or *alæ*, (fig. 77, *b*,) the two lower are shaped like the wings and parallel with them, and cohere by their lower margin and form the *keel* or *carina*, (fig. 77. *c*.)

This form of the corolla is peculiar to the order Leguminaceæ, including the Pea, Bean, &c.

84. It very frequently happens that we find in examining flowers, parts which we can refer to no organ with which we have become acquainted. They appear to be distinct from the calyx, corolla, stamens or pistils, and can be comprehended under none of these organs, although situated among them and attached perhaps to them. All such parts are called *appendages*, and, from the variety of form they assume, much confusion has been created in their description, from the want of uniform terms applied to them.

They have their origin either from the corolla or stamens. Every appendage arising from the corolla is called a *paracorolla*, and if consisting of several pieces a *lamella*. When one arises from the stamen, it is called a *parastemon*.

The appendages of the *Passiflora incarnata*, *Narcissus tareta*, and the several species of the *Silene*, are undoubtedly modified petals, while many appendages found among the Asclepiadeæ are as plainly modified Stamens. The term *corona* is most commonly used by writers to designate every appendage which appears regularly around the centre of the flower, whatever may be its origin. An appendage originating from stamens is generally fleshy, and has bundles of vessels corresponding to the number of stamens of which the corona is composed. This fleshy part of the appendage has received the name of *orbicularis*; horn-like processes arising from its summit are called *cornua*, the upper end of them is the *beak* or *rostrum;* and the back, if it is dilated and compressed, is the *ala* or *appendix;* horns proceeding from the base of the orbiculus are called *ligulæ;* the circular space in the middle of the top of the orbiculus is called the *scutum*.

The small appendage at the base of the petals of the Ranunculus, Prof. Lindly thinks, is "a barren stamen united to the base of the petal."

The *Spur*, *Calcar* or *nectarotheca*, is a hollow horn-like appendage developed on the back and near the base of the petal opening on the anterior face. Raspail considers this appendage as later in its formation than the petal, and hence concludes that it is rather an accidental organ, and that in cases wherever it is not developed the petal is in its normal condition, as sometimes happens in the Aquilegia.

Most of the above forms were considered by the earlier Botanists as *nectaries*, but with manifest impropriety, since but few, if any, of them secrete honey.

Bracts.

85. There are often to be found organs situated between the true leaves and the calyx, varying from them in outline, color and size, which are called BRACTS. Many varieties of bracts have been, till very recently, classed as varieties of the calyx; and some Botanists, even at the present day, adopt this arrangement. The bract seems to occupy a space between the leaf and calyx, not only by collocation on the plant, but in constitution and functions. They appear to perform the same office in many cases as the calyx, and in others seem not to differ in this respect from the true leaves.

Their position and form, have given them various names, of which the following are the most common.

When they appear as simple scales on the peduncle, or at

its base, they take only the general term *bract*, as in the *Heart's ease* and *Veronica agrestis*.

When they are verticillate and surround several flowers, they constitute an *involucre*, as in the *Umbelliferæ*. In *Compositaceæ* the involucre assumes the appearance of a calyx, enclosing many flowers, but each floret has a calyx more or less developed enclosing the seed and appearing on its summit in the form of *egret*, *scales* or an elevated margin. At the base of this involucre there are often bracts, not constituting a part of it; these are called *bractlets*, and the involucre is said to be *bracteolate*. In the *Cupuliferæ* the involucre assumes a more singular appearance, forming in the *Oaks* the hard cup shaped organ enclosing the base of the acorn, and in the *Chestnut* constituting what is well known by the name of BUR. The real calyx in these cases exists in a rudimentary form immediately surrounding the pistils, as may be readily observed in the pistillate flower of the chestnut. In the *Cornus* or *Dogwood* the involucre consists of the four large, white, showy leaves which one, not a Botanist, would take for the corolla. In the *Euphorbia* the involucre is composed of two rows of united leaves, forming what might be easily mistaken for a calyx and corolla, as the outer part is green, while the inner is colored. In the *Beach* it resembles a pericarp.

The bracts of the Catkin are usually called *squamæ* or scales, a term usually applied to any scaly appearance, and the organ on which such scales appear is said to be *squamose*.

The chaff on the receptacle of the compositaceæ is another form of the bract and they are called *paleæ*.

The *Spathe* is a bract which encloses the aggregated florets of a spadix, as in the *Arums*.

86. The kind of bracts which demands the most careful attention of the student, if he expects to encounter with success the large family of plants to which it belongs, is the form they assume in the *grasses*. We believe the great and discouraging difficulties which are encountered by the student in his very first efforts to analyze the plants of this important and interesting family of vegetables, is owing, more than to any thing else, to the failure in obtaining distinct ideas of the terms used in their de-cription and of their application.

Let the student take the *Crab-grass* Digitaria sanguinalis, as a specimen for examination. I mention *this*, because it may be found in all places included in this treatise, and in bloom through the summer, and known by every body. Other specimens might be taken, which would answer our purpose better in some respects, but the student might be unable to discover

to what grass we alluded, or it might not be found in all sections, but by carefully applying the following description to a specimen, the student will be enabled to apply his knowledge, by a little patience and perseverance, to other genera. Let us take a specimen of the Crab-grass. We find it consisting of three spikes of flowers. The flowers of each of these spikes we find arranged on one side of a common support called *rachis*, in two rows. If we take one of these spikes and bend it, we see the flowers, which before lay so closely to the stem, separate from it and exhibit themselves as little spikelets of about a half an inch long. By examination we find that each of these spikelets is composed of two flowers. One of these flowers we will take for examination. Instead of commencing with the outer envelops, as is common with other flowers, we will commence at the centre. We find at the centre the ovary, stamens and pistils; and immediately surrounding the ovary we find two opposite membranous bracts which we shall call *Paleæ*, as the highest authority of the present time gives them this name. Elliott calls them the *corolla*, and by different authors they have the names of *calyx*, *perianthium*, *gluma interior*, *perigonium* and *gluma*. Within the Paleæ of some grasses, as the *Bromus*, there are two small hypogynous, fleshy, colorless scales, which are called *squamulæ*. Elliott calls them *nectaries;* and in other cases, instead of the squamulæ are found bristles, as in the *Cyperaceæ*, called *hypogynous setæ*. Without the paleæ of our specimen of Digitaria, we find two bracts enclosing the others, which are called *glumes;* the *calyx*, *gluma exterior* and *tegmen* of authors. The glumes do not always enclose a single flower, but most generally are at the base of the spikelet, and enclose many flowers, as in some of the Panicums there are two, and in the Bromus several. In some instances there are many glumes with no flowers, as in the Schœnus, the lower ones being empty. The student may adopt as a general rule that those bracts immediately surrounding the stamens and pistils are *Paleæ*, and all others *Glumes*.

Inflorescence.

87. The manner in which flowers are arranged on the flower-bearing stem or branch is termed *Inflorescence*. From the fact that all floral organs are modifications of leaves, and have the same origin, it follows, of course, that primarily they have the same arrangement, however modified this arrangement may become in the course of development. By observation

we may easily reduce all the various forms of inflorescence to two primitive types, the *determinate* and *indeterminate* arrangements.

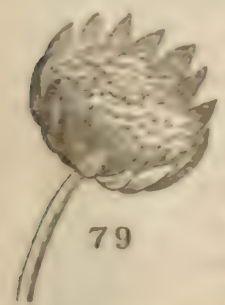
By *determinate* arrangement is meant that kind of inflorescence which occurs when the primary axis of the plant is terminated by a flower; (meaning by the *primary* axis the stem arising from the root.)

The most simple case of this kind is when the stem bears a single flower; there being no secondary axes.

When the secondary axes are developed, the lower being proportionably longer, so that all rise to the same height with the central flower, we have a Corymb, (fig. 78;) but if neither the primary nor secondary axes lengthen but become crowded together around the same point, we have the *Capitulum* or head, as in the compound flowers, (fig. 79.)

78

Each little flower comprising a capitulum is called a *floret*. The florets are often very different in appearance, some consisting of a ligulate or flattened limb arranged around the circumference like the petals of other flowers, and are called *ray florets* as are seen in the *sun flower*, while the central are usually tubular and unconspicuous and are called *disk florets*. The ray and disk florets often differ in respect to the organs they contain. Sometimes they are both perfect, that is, both containing stamens and pistils, when they are said to be *homogamous*; at others the ray florets may be destitute of either stamens or pistils, or contain pistils only, and the disk contain only stamens; in any of these cases the capitulum is said to be *heterogamous*.



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But if like the capitulum in other respects the axes are lengthened in proportion to the distance from the center, we have the *umbel*, (fig. 80,) in which the pedicels all originate from the same point; and if the second axes develop tertiary axes in the same manner as the primary develop the secondary, we shall have a compound umbel, as in fig. 81.

80

The whole taken together is called the *universal* umbel, while those supported by the secondary axes are *partial* umbels.

81

These axes themselves are called *radii*.

The preceding varieties follow the *centripetal* order of flowering, that is, the flowers farthest from the centre expand first.

But there are others of the determinate form which follow the centrifugal order, that is, the central or upper ones expand first, and the external or lower ones last. When the secondary axes start from the same point, as in the umbel, but these dichotomizing producing tertiary branches, with a flower in the axil, we have a *cyme*, (fig. 82.)

82

A *glomerule* is similar to a capitulum, but differs from it as a simple umbel does from a compound one, that is, it is composed of numerous capitula, enclosed in a common involucre as in the *Echinops* or *Globe Thistle*.

A *Fascicle* is of the centrifugal order of expansion, and is, in other respects, similar in appearance to the umbel, but has the arrangement of the cyme with the flowers more compact and branches shorter. The *Pink tribe* affords examples.

Indeterminate Inflorescence.

88. This form of infloresence is characterized by the continued growth of the primary axis, while the secondary and tertiary are arrested.

83

The *Spike* is of this form and is supposed to be produced by the continued elongation of the primary axis, while the secondary, having no power of elongation, produces sessile flowers along a common axis, which constitutes the *spike*, (fig. 83,) as in the Plantains.

84

When sessile flowers are arranged on a filiform rachis, which falls off after flowering, it is called an *ament*

or *catkin*, as in the Willow, Hazle, &c. (fig. 84.) When a fleshy axis is densely covered with flowers enclosed in a spathe, it is called a *spadix*, as in the Arum. (fig. 85.)

If the secondary axes are equally developed around the primary, as in the Currant and Hyacinth, we have the *raceme*, (fig. 87.) The raceme differing in no respect from the spike, but in having pedicilate flowers.

If the secondary axes develop tertiary ones a *panicle* is formed, (fig. 88,) as in the Poa. The term *deliquescent*

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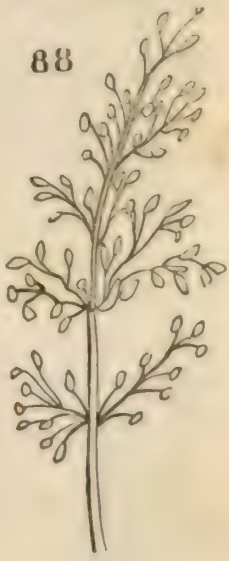


panicle is applied to that variety of the panicle, when the rachis is lost in its irregular divisions and does not continue direct through the inflorescence. The ramification of the axes may proceed further, forming compound panicles. A very dense panicle, with the lower branches shorter than the middle ones, is called a *thyrsus*, as in the *Lilac*.

89. The preceding arrangement is that given by the writer of the treatise on Botany, in the Library of Useful knowledge, and it seems to offer a much more simple exhibition of the various forms of inflorescence than has fallen under our observation. It founds it on hypotheses which are simple and always applicable; so that by a few moments labor the student may gain principles which he can readily apply in arranging the various forms of inflorescence with which he may meet.

An entirely new theory has been proposed by the continental Botanists of Europe, but it is much too difficult to be comprehended by beginners in Botany or to be applied to any practical purposes, in any state, in which we have seen it, and our limits forbid our giving even an outline of it.

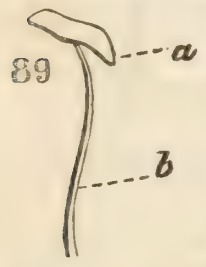
There are various parts about a flower which need to be noticed before we pass from this subject. The small branch which bears a single flower or bunch of flowers, is called the *peduncle*. When the peduncle bears many flowers the little organ that supports each flower is called a *pedicel*. Sometimes the peduncle is itself divided and its divisions are called branches.

When the peduncle rises from the earth and bears the flower, it is called a *scape*. A *rachis* is a peduncle that proceeds through the center of the infloresence from the base to the apex. It is also called the *axis*.

When the part that bears the flower instead of being lengthened into a rachis forms an enlarged and flattened surface at its extremity, on which the flowers are arranged, it is called a *receptacle*.

Stamens.

90. Immediately within the corolla are situated a row of organs called *stamens*. The stamens, like the calyx and corolla, are modifications of leaves. They usually consist of three parts, *filament*, *anther* and *pollen*. The *filament* is the thread-like organ which supports the anther (fig. 89, *b*.) This is not necessary to the functions of the stamens any more than a petiole is necessary to a leaf. The *anther* is the knob, usually yellow or brown, situated on the summit of the filament, (fig. 89, *a*,) or if the filametbe absent, it sits upon the receptacle. The *pollen* is the yellow dust-like substance contained within the anther, and is necessary in the vegetable economy to the perfection of the seed.

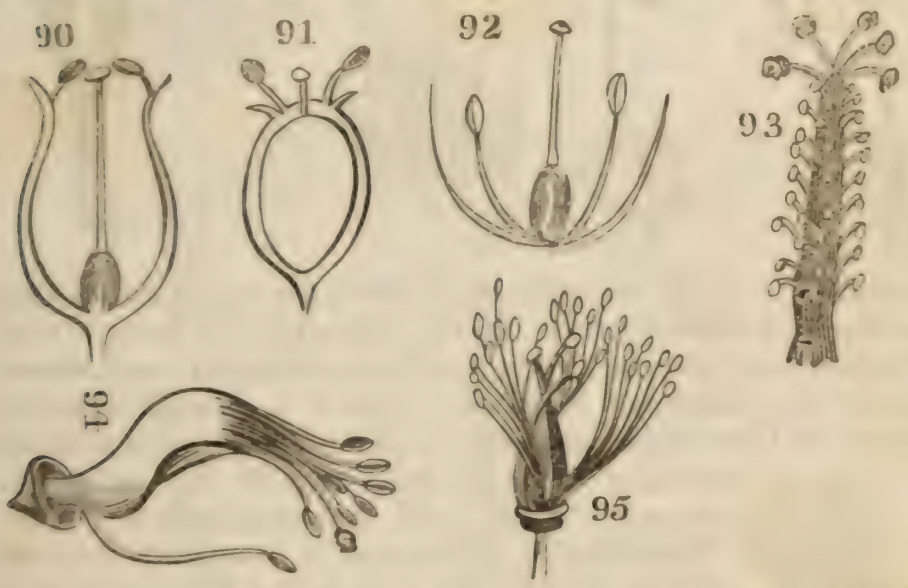


91. The arrangement of the stamens is usually alternate with the petals or their segments, and of course opposite those of the calyx. It was on this circumstance that Linnæus founded his test for the distinction of calyx and corolla. If the stamens were opposite the segments of the floral envelop, he called it a calyx ; if alternate, it was to be called a corolla. When but one row of each is developed this is no doubt an undeviating criterion ; but it may happen, supposing the real corolla to be present, that the whorl of stamens next above it is suppressed and the second whorl only developed ; in such cases, the stamens would necessarily be opposite the segment, but by the application of Linnæus' criterion the inner envelop would be a calyx and the outer the corolla, as in the whole

order of *Primulaceæ*, in which the regular calyx is present. This arrangement may easily be accounted for upon the above supposition; and it receives confirmation from the fact, that some plants having twice as many stamens as petals, and having the appearance of being in a single row, yet half of them are alternately longer than the other half. This occurs in the Oxalis giving probability to the supposition that the five short stamens of the Oxalis were prevented from being developed as perfectly as the other five, and had they been entirely prevented we should thus have had an arrangement similar to the *Lysimachia* with the opposite stamens.

The number of stamens is generally the same as the petals or lobes of the corolla, or a multiple of the number.

92. Whatever may be the apparent origin of the stamen its real origin is always the same, that is, between the base of the petals and that of the ovarium. Their apparent origin varies remarkably, sometimes appearing to rise from the calyx or corolla, (fig. 90,) when they are said to be *perigynous;* at

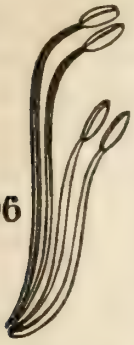


others they arise from the pistil (fig. 91) itself and are said to be *epigynous*, or from under the pistil. their true origin, and called *hypogynous*. (fig. 92.)

93. Stamens are often united by their filaments, forming a tube, as in the *Malva*, when they are said to be *monadelphous*, (fig. 93.) or in one brotherhood. In other cases into two sets, when they are said to be *diadelphous* (fig. 94.) as in the Pea. If into several sets the term *polydelphous* is applied, (fig. 95.) as in some Hypericums.

If the stamens project beyond the corolla, they are said to be *exserted*, and *included* when shorter than the corolla.

When the stamens all turn to one side of the corolla they are said to be *diclinate*. When a flower has four stamens, two of which are longer than the other two, they are *didynamous*, (fig. 96.) If there are six with four the longest, then they are *tetradynamous*, (fig. 97.)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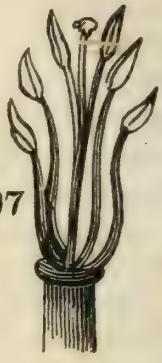
94. The *filament* is generally, as its name implies, a slender thread-like organ, having a bundle of vessels in its centre composed of woody fibre and spiral vessels, and corresponds undoubtedly to the petiole of the leaf. It assumes a variety of forms. Its normal form is found in the *Rose*, *Apple* and *Lily*. In the *Canna* the filament resembles so much a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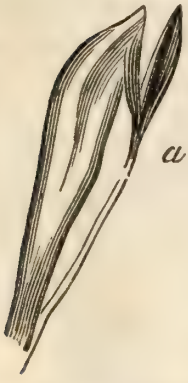

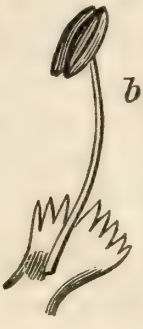

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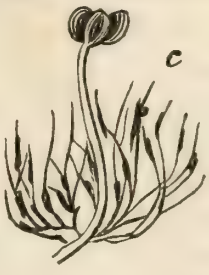
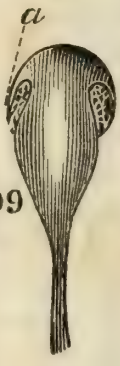
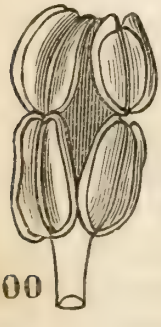




99

petal that it would be undistinguishable from one, but for its bearing an anther (fig. 98 *a*.) In the Water lily it is found in every degree of development from its common form to a petal, showing the true nature of the stamen, that it is a modification of leaves. In the *Campanula* the lower part of the filament assumes the form of a fleshy scale (fig. 98 *b*.) Although generally smooth, still in some plants, as in the *Tradescemtia*, it becomes in some parts covered with hairs, (fig. 98, *c*.) In the *Thalictrum* it is thickest at its summit, and is said to be *clavate*, (fig. 99.) Sometimes the filaments are united together with the style into a solid column under thename of *columna* or *gynostemium*, (fig. 100.)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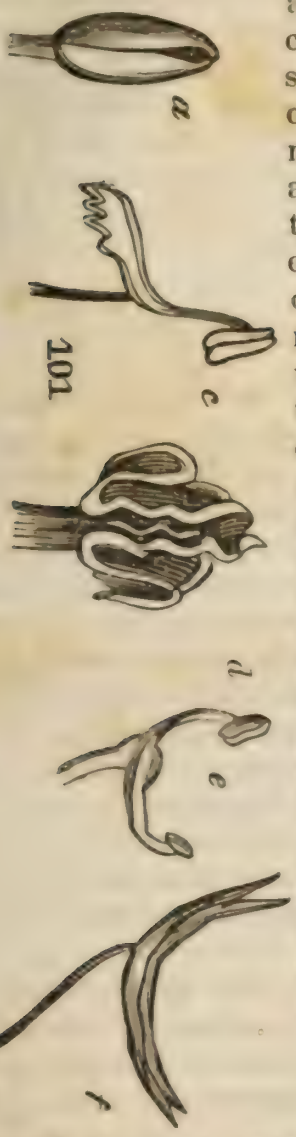
Anther.

95. The *anther* is generally composed entirely of cellular tissue and consists of two *lobes*, united by a *connectivum* filled with pollen. The connectivum corresponds to the midrib of

the leaf, while the lobes are formed by its lamina, folded so as to form its cells. The variations in form of the anther, are very numerous; but by strict observation every variety of appearance it may assume, may be accounted for on the principle that it consists, in its normal state, of two parallel cells, formed by the folding of the lamina of the leaf, and these cells connected as in the leaf, by the midrib. The true type of the anther, then, is two lengthened parallel cells, (connected together,) opening by a longitudinal suture corresponding to the margin of the leaf of which the anther is composed. It sometimes happens that the septum is absorbed or not developed, when it is one celled, as seen in fig. 101, *a*; at other times one half of the lamina seems not to be developed, and a one celled anther is the result, as in the *Canna*. Sometimes the connectivum spreads out at its summit, the lobes instead of being parallel assume every degree of inclination. In the Monarda they are at right angles, and should the points of the lobes grow together, as in the *Mallora*, we have a one celled anther from this cause. In the *Sage* but one side of the connectivum bears an anther, the other side being very differently developed, and assumes the appearance represented in fig. 101, *c*.



It sometimes happens that the anther is more than two celled. This is occasioned, in some cases, by the folding inwards of the sutures, so as to form a union with the back of the cell, as in the *Ash*.

The *Cucurbitaceæ* presents a curious modification of the anther, in which they are long, narrow and sinuous and folded back upon themselves, (fig. 101, *d*.)

When the anthers are attached by their base to the summit of the style, they are said to be *innate*, when by their back *adnate*. When they seem to be balanced on the top of the style they are said to be *versatile*. The anthers of *grasses* are versatile. When the anthers are turned inwards, they are said to be *introrse*, and when turned outwards *extrorse*.

The connectivum often appears under modified forms. Some of these we have already noticed, as in the *sage*. In the *Asclepias* also the little horns observed in the flowers of these plants, are developments of the connectivun. Sometimes it is very much enlarged, as in fig. 102, at others forked, as in fig. 103, at others forming a crest, and again forming a cup-like body articulated with the apex. The position it occupies in these and other cases, will enable the observer to determine to what organ it is to be referred.

102

103

Pollen.

96. The *pollen* consists of exceedingly minute grains, which, under the microscope, appear of various forms. In some they are smooth and spherical, as in the *Marvel of Peru;* in others with an equatorial whorl of conical papillæ, as in the *Hibiscus grandiflorus*; in others angular, some nearly square and of every variety of geometrical figure. It would be useless to specify the great variety of forms under which this substance appears, as it has, as yet, been made of little practical importance in arranging plants, although so far as we have made observations on this subject, we believe it might in some cases be made a good specific character, and in others a generic one of much importance. We have never found a variation of form in the same species and in some extensive genera, so far as we have examined them, the form is invariable.

The student can scarcely find a field for more curious observation, if he has a good microscope, than is presented by the pollen. The variety of beautiful forms it assumes, in different species, and the curious structure of the pollen grain itself, present subjects of much interest.

97. The term *gemule* has been applied to the pollen grains. They enclose a fluid of molecular matter essential to the production of the seed. The molecular formation may be beautifully observed by sprinkling some pollen on the port-object of the microscope, and dropping on it some diluted sulphuric acid. The coats of some of the grains immediately burst, and the contents of the grain are projected into the fluid, and the molecules may be distinctly seen. The pollen has been determined, by the most accurate observers, to consist of two coats, at least, the outer and thicker one called the *extine*, the

inner the *intine*, which is very extensible and exceedingly thin. This may be exhibited by placing some pollen in very dilute sulphuric acid and instead of bursting as in the case mentioned in the preceding paragragh, projections will be seen to arise from the surface of the grain and extend into the fluid. These lengthen till the contents of the granule are exhausted and consist of the intine projecting through the coat of the extine. By the sulphuric acid many tubes are projected from the same grain, naturally only one or two. Two other coats have been detected in particular plants, but have not yet been demonstrated as a common structure; the one next the extine, but interior in respect to it is called the *intexine* as in the *Onagraceæ*, the other between this and the intine is called the *exintine*, and is found in the *Cupressus*.

Raspail asserts, and we think with very good reason, that the pollen is a production of the internal surface of cells within the theca, to which the grains are attached by a funicle. Chimie Organique tome ii. p. 172. This is denied by other Botanists.

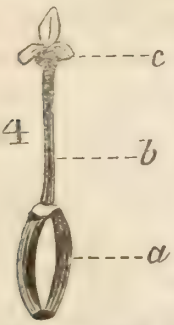
98. The color of pollen is generally yellow; but it assumes in different plants almost every color except green. The matter contained within the pollen cells is called *fovilla*, which we before remarked consists of minute molecules, measuring, according to Lindley, from the 4000th to the 30000th of an inch in length, and are of two kinds, one larger than the other. The larger are proved to be starch, from the blue color given by the action of iodine; the others are by Mohl and Fritzsche considered to be minute drops of oil. When a pollen cell bursts in a fluid, these molecules are observed to possess a regular rapid motion on their axes, and the larger undergo a kind of "spasmodic contraction of the side." Much speculation has been elicited in explaining the constitution and function of these molecules; but as yet very little has been settled as to their nature by any investigations yet published. Brongniart some years since published the singular opinion that the molecules, which issued on the bursting of the pollen, were spermatic animalcules. He described the form, dimensions, and movements upon which he based this opinion. This announcement called forth much discussion, and the opponents of B. thought their conquest now complete, when they proved that, infusions known to be fatal to all animalcules, did not arrest the movements of that issuing from the pollen cell. But the distinguished Professor Mayen, of Berlin, in a letter to the Academy of Sciences of Paris, in 1838, says that the *molecules* are not the animalcules, but that *they* occupy the

interior of these cells, and produce the molecular motion by their interior action. The point as to their existence is as far from being settled as ever. Some botanists, speak of them as though there was no doubt of it, while others treat the subject quite cavalierly, by applying to it the not very scientific term, "ce roman!"

99. The larger particles of the fovilla, have been considered as the necessary organs of impregnation. It is conjectured that they make their way into the ovule, and through their agency acting as potential organs, the embryo is produced. This needs confirmation. Schleiden and Endlicher take entirely different views of the subject. They believe that the incipient embryo is in the pollen tube which makes its way into the ovule merely for finding a proper location for its development. These are some of the notions prevalent on this highly interesting and important part of the vegetable economy. Which, or whether any of them, will ever be established as true, remains for future discoveries. We shall notice some points more fully in the article on Fertilization.

Pistil.

100. The *pistil* is the center of the flower, and forms the summit of the axis of growth. It is like the other floral organs, a modification of the leaves. The pistil is divided into three parts, the *germ*, (which becomes the ovary,) *style* and *stigma*.



104

The stigma, fig. 104, *c*, is the summit of the pistil, and is the extremity of the midrib of the leaf which composes the pistil. It is the only part except the spongioles, that is not covered with the cuticle. It is generally glutinous and moist, thus causing the pollen grains to adhere to it, and at the same time yielding enough moisture to make them put forth the pollen tubes. It is covered with papillæ which are undoubtedly the cells of the parenchymous substance of which it is composed, and is the channel through which, in all cases, the fecundating matter is transmitted to the ovule. It varies much in form, or if with some botanists, we consider the stigma only a surface fitted for the reception of the pollen and transmission of the fertilizing substance, the variety of forms of stigma usually described by botanists would properly come under the style. Lindley remarks that nothing, properly speaking, is a stigma except the secreting surface of the style. This surface is usually on the expand-

ed summit of the style, but it frequently occupies other situations. In the Iris it is a line on the back of the trifid petal-like style; in some it occupies the side of the pistil; in others no point can be detected, by observation, that corresponds in appearance to the stigmatic surface. The central part of the stigma consists of a more lax tissue which leads directly to the ovary, and is called the *conducting tissue*.

101. The *style*, fig. 104, *b*, is a vascular organ, varying in length, supported by the ovary, and supporting the stigma. It is generally considered an unessential organ; but Raspail says that the style penetrates the ovary and becomes the placenta, which would render its presence always necessary; but this is in opposition to all other botanists, so far as we know, the placenta being considered the union of the edges of the folded leaves composing the ovary. The style is sometimes articulated to the summit of the ovary, at others forms a continuation of it. Although the style usually rises from the summit of the ovary, yet in some cases it does not. In the *Labiatæ* it comes from the base, and in others from the side. These apparent variations are produced by the unequal development of the parts of the ovary; one side being extended more than the other, would, of course, turn the summit to the least developed side.

102. The *Ovary*, fig. 104, *a*, is the thickened base of the pistil, and is that part of the organ containing the ovules, and becomes the fruit in maturity, whatever may be its form. The ovary, when the pistil is composed of a single leaf, is formed by the folding of the leaf with the upper surface inwards and united by its edges, the lamina of the leaf forming the ovary. This arrangement is well exhibited by the *Peach*. The furrow, which is always seen running from the apex to the base of this fruit, on one side, is the united margins. The midrib on the opposite side is undistinguishable on the surface, but by dissection the vessels will be found larger on that side, and running more directly from the base to the apex.

105

103. The *Placenta* is the union of the two margin of the carpels, and bears the ovules which in maturity become the seed. By carefully breaking the stone of the Peach, we shall find the kernel attached to that side of the cavity which corresponds to the depressed line on the surface, showing that the kernel or nucleus derived its origin and support from that side which is formed by the margin of the leaf. The Cherry is another example of a monocarpelous pistil, Fig. 105.

Although some plants, like those above noticed, have their pistils of one leaf, yet in most cases they consist of several carpels, assuming a great variety of forms. It is of the first importance, that the student study carefully all that relates to the fruit, as it is from it that the most important distinctions in classification are derived. It will be the most difficult as well as the most important subject to which his attention will be called. By perseveringly applying the principles laid down, he will soon acquire a facility in examining, one of the most beautiful fields of nature, which will abundantly reward him for all his toil.

104. When the ovary is composed of several carpels, the carpels are arranged with the midrib placed outwardly, and the margins turned inward towards the center, as seen in the transverse section of the *Hibiscus*, fig. 106, which is composed of five carpels, with their margins meeting in the center, forming a *central* placenta, to which the seeds are attached. The divisions, which form the cells of the ovary, are called *dissepiments*, and are of course, from what we have before remarked, the inflected laminæ of the leaves; and as each carpel is naturally independent of the others, which compose the ovary, it follows that the dissepiments, however thin and membranous they may be in some cases, are in reality double. All true dissepiments are necessarily vertical, and never horizontal, since the inflected margins of leaves could not unite in such a manner. The number of dissepiments is always equal to the number of carpels of which the ovary is composed, and the dissepiments are always alternate with the stigmas. A simple ovary can have no dissepiment. Should any fruit be observed with dissepiment not reconcible to the above principles, they are called *spurious* dissepiments. The only common one of this character with which students will meet is that occuring in cruciferous plants, as the Cabbage, Turnip, &c., in which the expansion of the placenta forms a spurious dissepiment, stretching from one side of the ovary to the other. In some cases in which the ovary is composed of several carpels, there exists no dissepiment. This arises from one of two causes. In one case the edges of the carpels are united without being inflected much, if at all, as in the *Corydalis* and *Viola* fig. 107, where the

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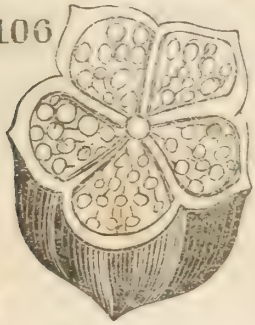

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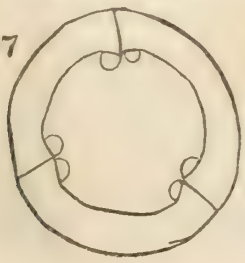


placenta is said to be *parietal*. In the other case the dissepiments exist in the very early stage of the ovary, but by the enlargement of the ovary without the corresponding development of the dissepiments, they become torn and obliterated with the placenta remaining alone as in the *Cerastium*. In this case it is called a *free central* placenta, fig. 108.

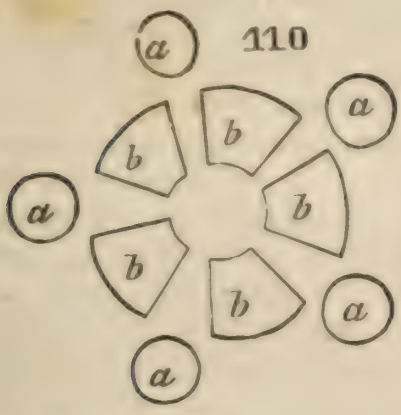
108

It is frequently the case that there are numerous carpels, but they contract no union with each other as in the *Strawberry*, *Ranunculus* and *Anenome*.

When the carpels are united as in the *Poppy*, Hibiscus &c., they are said to be *Syncarpous*. When they are free as in the Ranunculus. Strawberry, &c., they are called *apocarpous*.

105. It follows from the assertion, that the pistil consists of a whorl of leaves, immediately superior to those composing the stamens, that they should be alternate with them in their usual position. This is the fact in cases in which we are able to determine in regard to it.

110



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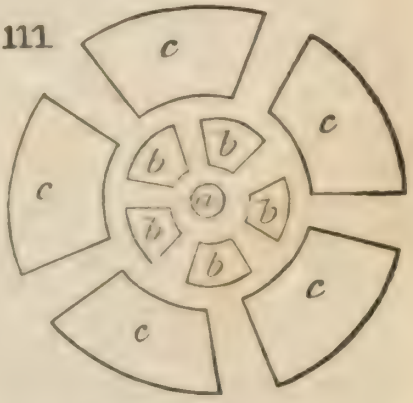

If in fig. 110, *a*, *a*, *a*, *a*, *a*, represent five stamens, and *b*, *b*, as many carpels, it will be observed that the stamens occupy alternate positions in respect to the carpels.—This is undoubtedly the fact in all cases which are not altered by non-development or unusual modifications. When the carpels consist of several whorls on the same plane, the individuals of contiguous whorls follow the same law of alternation, as is exhibited in fig. 111, in which *a* represents the axis, *b*. *b*. the whorl contiguous to it, and *c*. *c*. the exterior whorl.

In some cases the receptacle is either convex as in the *Strawberry*, fig. 112, or concave as in the *Rose*, fig. 113. In

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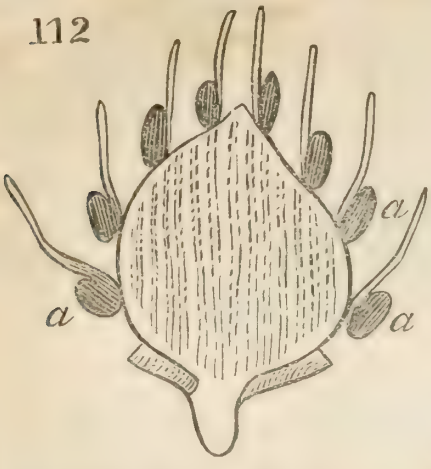

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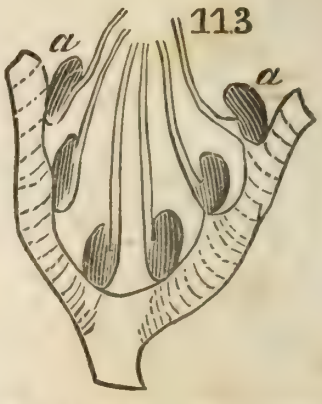


the former case the outer series *a*, *a*, will be the lowermost whorl, and in the latter, the upper whorl will be in reality, the lowermost in point of development, becoming the most elevated contrary to its true position by the peculiar development of the receptacle.

106. From the above remarks, it will be easy for the student to reduce to known principles most of the forms of fruit with which he will meet, but there are cases which it is difficult to reduce to the principles laid down. These structures have received various solutions from different Botanists. Some endeavor to reduce them by the above principles, others adopt other principles for explaining them. In the *Orobanche*, the placentæ instead of being placed at the section formed by the union of the carpels, are placed in pairs on the face of each carpel and at some distance from the margin. There are several anomalies of this character, and in reference to them Lindley remarks, that the position of the placentæ with regard to the margin of the carpels is reducible to no certain rule, but depends on specific organization. That a vast majority of cases are reducible to the foregoing principles, it is admitted by all, and that some cases considered as anomalies are reducible to the same principles, we have little doubt. The *Orobanche* it seems to me, may be easily explained by supposing the margin of the carpels inflected on themselves from a union of surface, instead of being directed to the center, when of course, the placentæ would be apparently on the face of the lamina instead of its margin. The close resemblance of buds and ovules, and their supposed and probable identity of origin, is adduced as proof of the placenta not necessarily originating

in the margin of the carpels. It is admitted that the margins of leaves usually give rise to buds as in the *Bryophyllum*, when they produce them at all, yet in a single case mentioned by Turpin, they were found issuing from all parts of the surface; it is therefore concluded, that in all cases where the placenta is on the surface of the carpel, it corresponds to the case of the *Ornithogalum*, mentioned by Turpin.

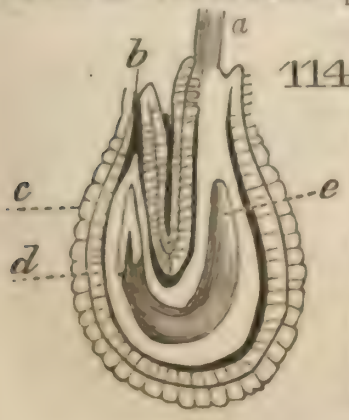
Schleiden rejects the theory of the margin of carpels giving rise to the placenta, but considers the placenta an elongation of the axis. In cases of parietal placentæ he considers them as the result of a branching axis. Raspail says that the style penetrates into the ovary and forms the placenta.

Our space forbids adducing the arguments by which these hypotheses are supported. That each is true in certain cases is possible, but we do not believe it is often the case.

The extremity of the axis, which supports the carpels is called the *receptacle*. In some cases it is merely the end of the flower bearing branches without having undergone any modification; at others, it is an expanded disk and is called a *torus*. When it rises from the basis of the calyx, bearing the stamens as in the *Magnolia*, it is called *Gynophore*. When it is succulent bearing many ovaries as in the Strawberry, it is called *Polyphore*. We have the *Gynobase* when a fleshy receptacle has but a single row of carpels inclined towards the center.

Ovule.

107. The *Ovule* is the seed in its incipient state. It is always attached to the placenta, from which it arises and receives its nourishment. In its earliest state it is a mere tubercular homogeneous projection from the placenta, semi-transparent and pulpy, exhibiting few marks of what it becomes in the course of development. The cord by which the ovule is attached to the placenta is called *Funiculus*, fig. 114. *a*, which exhibits an ovule of the Lepidium, and the point of the ovule to which it is attached is called the *hilum*. The base of the ovule is the point where the funiculus is attached, and the opposite point the axis is its apex. As the ovule advances in growth it consists of several parts, a central, fleshy, pointed body, called the nucleus, fig. 114, *c*. which is enclosed in



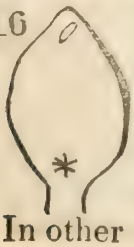
114

two sacs. The outer one *c.* is called *primine*,the inner one *d.* the *Secundine.* These sacs are very much open in the early stage of the ovule, and in fact in some plants are not unlike two tea cups one within the other, with the nucleus in the inner cup as seen in fig. 115, where *a* is the primine, *b* the secundine, and *c* the nucleus. These sacs increase in size and contract their orifice, till the secundine closes over the nucleus entirely, with the exception of a very small orifice, called a *foramen*, fig. 114, *b.* and the foramen of the secundine is called by Mirbel *endostome.* The primine in its growth encloses the secundine and nucleus, with the exception of a foramen corresponding to that of the secundine and called the *exostome.* These terms are not in general use, and it is doubted whether the importance of the distinction demands their application. It is true that in some cases the foramen of the secundine does not exactly correspond to that of the primine. The simple term foramen however, answers all practical purposes. There are three other coverings of the nucleus described by some Botanists named *tercine*, *quartine* and *quintine*, but much uncertainty exists in reference to them, and great difference in opinion, even among the most distinguished philosophers, some even denying their existence. We deem it inexpedient to occupy our space with the discussion of a subject concerning which, from our own observation, we have been unable to come to any satisfactory conclusion. The figure to which our illustration is applied, the student will perceive, exhibits the nucleus and its coverings in a curved position; this is its true position in a perfect state in many plants, but not in its early stage; in the progress of development, it assumes this position. The ovules of different plants, although the relative position of the parts are nearly the same in their early stage, yet in their growth, assume several different positions reducible to four different types.

115

108. When no change of position takes place, but the base of the ovule remains next to the placenta with the axis straight and the foramen at its extremity, it is said to be *Orthotropus* as in fig. 116, which is the case in the nettle. But it frequently happens that one side of the ovule only is developed and the axis becomes doubled on itself, so that the foramen is contiguous to the base or hilum, as in fig. 117, which is called *Campylotropus.*

116



117

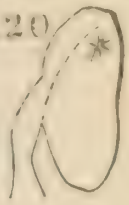
In other cases the whole ovule becomes inverted so that the foramen points towards the placenta

with the hilum opposite to it; this form of the ovule is called *Anatropus*, fig. 118. The apple affords an example and it is very common. A bundle of vessels runs along the ovule from the placenta, and unites with it on its opposite end; this bundle of vessels is called a *Raphe*, fig. 118. *a.* and the place where it unites is called the *Chalaza*, fig. 118. *b.* In other cases the ovule seems to have made but one fourth of a revolution, so that the line joining the chalaza and foramen is at right angles to the funiculus; this form is called *Amphitropus*, fig. 119. In other cases the raphe instead of adhering to the ovule through its course, is attached to it only in the last half of its length, this is called *Semianatropus*, fig. 120, and the ovule is parallel with the funiculus.

118

119

120



109. The position of the ovule in the ovary is of importance. When it grows from the base of the ovary it is called *erect*, when from a little above the base *ascending*, when it hangs from the summit of the cavity it is *pendulous*, and when from a little below the summit it is *suspended*.

Fruit.

110. The *fruit* is defined, in Botany, to be the pistil or ovary arrived at maturity, including, sometimes, accessary parts. This definition plainly gives greater extension to the term than it has in common language, as it includes every kind of product which has the mature ovary as a component.

The normal form of fruit and the type to which all varieties should be reduced, would seem to be that in which the seeds are contained in a pericarp with the carpels leaf-like in their constitution and appearance, as the Hibiscus, Bean, Cabbage, &c. In these cases it requires no great stretch of the imagination to conceive the ovary composed of leaves slightly modified, but from this type there are remarkable variations caused by one or more of the following causes. The suppression or hardening of parts in some, their unusual development in others, and by the union of other organs with the ovary, are the principle causes of variation. By carefully noticing these occasional modifications, every variety of fruit may be reduced to these simple principles.

Before applying these principles to the explanation of par-

ticular cases, it will be necessary to define some terms used in the description of fruit.

111. The *pericarp* is the covering of the seed whatever may be its form or dimensions. It includes the ovary and whatever may be attached to it which goes to make up the seed vessel. It varies in dimensions from the covering of the minute seeds of grasses to the the large fleshy pericarps of the Cucurbitaceæ, which sometimes attain to several feet in diameter. Its composition is not less various, from the finest and most delicate membranes to the coarsest and roughest of vegetable productions, from the softest pulp to the hard, bony covering of the kernel of the peach.

The pericarp consists of three parts; the *epicarp*, which is the outer covering and corresponds to the skin; the *sarcocarp* is the middle portion which constitutes the flesh, and *endocarp* or *putamen* the inner coat or shell. By the various modifications which these several parts undergo in the course of development, most of the fruits, however widely they may differ in appearance, may be easily conceived to originate from a common type.

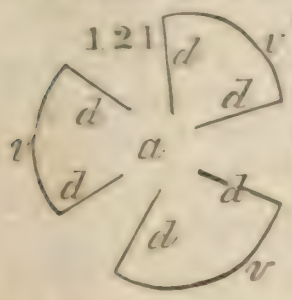
In the Peach, for example, the skin, which in many cases may be easily removed, is undoubtedly the epicarp in its natural state; the fleshy portion which is eaten, is the sarcocarp, which is the parenchymous portion of the leaf excessively developed; the stone of the peach is the endocarp remarkably condensed and hardened. The Cherry and similar fruit are reducible on the same principles. The Apple is a little differently constructed; the epicarp is in its natural state, but the sarcocarp consists of the parenchymous portion of the calyx and ovary united. By making a transverse section of an apple the outlines of the ovary may be seen distinguished by points, which are the cords formed by the vessels and woody fibre of the midrib of the leaves which compose the carpels. The hard layer, which immediately surrounds the seed, is the endocarp.

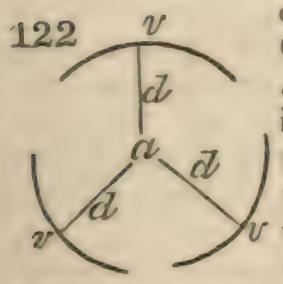
112. The fruit being the perfected ovary, it of course ought to bear the mark of the style or stigma, and it is of importance, that the student bear this in mind, as it will often enable him to distinguish seed from fruit, as there are many examples which the common observer would call a seed, but which in reality are fruits, consisting of pericarps and a seed within it, as in the Umbelliferæ and Compositæ.

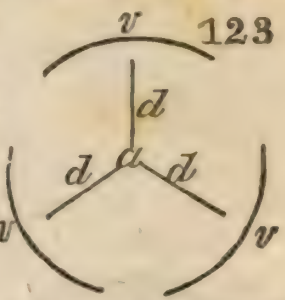
There are cases in which suppression of ovules causes a variation in the fruit from what might be expected from an examination of the ovary in its early stage. If an ovary

of the Chestnut be examined before or soon after impregnation, it will be found to contain fourteen ovules in seven cells: but in the progress of development it becomes one-celled, and thirteen of the ovules are obliterated. The ovary of the Oak is originally three-celled, with six ovules; but when perfected it is one-celled and one-seeded. There are many cases of this kind. The reverse of this takes place in some cases, which would be inexplicable, were not the ovaries examined in their earliest state. A one-celled ovary becomes a two or more celled fruit: in the Cruciferæ by the enlargement of the placenta; in the Astragalus by the expansion of the suture, in other cases by the dilations of the lining of the pericarps which form horizontal dissepiments. The Pomegranate presents a remarkable variation from the true type.

113. When the fruit arrives at maturity the pericarp either bursts or it remains closed; if the latter, it is said to be *indehiscent*, as in the apple, hazle-nut, &c. If it bursts it is said to be *dehiscent*, and it follows invariably the same course in the same species; hence it is important to notice the varieties. In some cases the dehiscence takes place by dividing the dissepiments, that is the carpels separate into their original leaves, as in the Delphinum, and this is called *septicidal* dehiscence. Fig. 121 represents this kind in which *a* represents the axis, *d* the dissepiment, and *v* the valves. In other cases the dissepiments are attached to the middle of the valves, and the dehiscence in such cases, no doubt, takes place at the midrib of the leaves that form the carpels. This is called *loculicidal* dehiscence, as in the Lilac, Gladiolus &c. fig. 122. *Septifragal* dehiscence is when the dissepiments separate from the valves, but adhere to the axis as in the Convolvulus, fig. 123.







In *sutural* dehiscence there is but one carpel, and of course no true dissepiments, as in the Pea and Bean. The *circumscissile* dehiscence occurs by a transverse separation of the valves half round the pericarp, as in the Anagallis. This is an uncommon mode. The Plantago has a *transverse* dehiscence.

Besides the above modes of opening, the pericarp is often *ruptured*, produced by a contraction of a portion of it, and

holes thus formed for the emission of the seed, as in Campanula. An *aril* is an enlargement of the placenta, occuring after the impregnation of the ovule, and forming, in some cases, an additional envelop for the seed, as in the Euonymus. *Mace* is an aril surrounding the Nutmeg. When the two sutures separate from the valves they form a kind of frame called *replum*.

114. The subject of carpology, or the classification of fruit is in a very confused state. Not less than six or eight systems have been proposed to the world since the days of Linnæus. Very little care is manifested by many botanists in their descriptions of plants in using carpological terms. No definite idea seems to be attached to them in numerous cases, and they are often applied in a manner by no means appropriate, and of which the authors seem not to be aware of their real meaning or extension. It seems to us of prime importance, that some system should be adopted, and that it should be universally used by Descriptive Botanists. The system proposed by Professor Lindley seems to us least objectionable, as it is an improvement on all preceding systems, and old terms are strictly defined and limited. Coming from such a source, it will no doubt receive the approval of all who have no other object than that of Botany to advance by their efforts in this field. It seems certainly to be founded on fixed principles, and little more can be expected than what is now accomplished in this interesting department of Botany, and to get it introduced with accuracy is all that is to be desired.

Professor Lindley divides fruit into four classes.

Class 1. APOCARPI. *Fruit simple.*

Ovaria strictly simple ; a single series only produced by each flower.

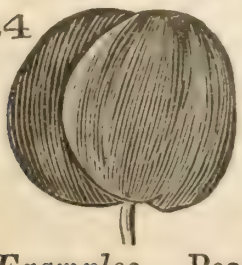
1. *Utriculus*, one celled, one or few seeded, superior, membranous, frequently dehiscent by a transverse incision.

Examples. Amaranthus, Chenopodium.

2. *Achaenium* one-seeded, one-celled, superior, indehiscent, hard and dry with the integuments of the seed distinct from it.

Examples. Lithospermum, Borago.

124



3. *Drupa* one celled, one or two seeded, superior, indehiscent, the outer coat soft and fleshy, separable from the endocarp, which is hard and bony, proceeding from an ovary, which is perfectly simple, fig. 124.

Examples. Peach, Plum, Apricot.

125

4. *Foliculus*, one-celled, one or many seeded, one valved, superior, dehiscent by a suture along its face, and bearing its seeds at the base, or on each margin of the suture, fig. 125.

Example. Pæonia.

5. *Legumen*, one-celled, one or many seeded, two valved, superior, dehiscent by a suture along both its face and its back, and bearing its seeds on each margin of the ventral suture, fig. 126.

Examples. Bean, Pea, &c.

126

127

6. *Lomentum* differs from the legumen in being contracted in the space between each seed, and then separating into distinct pieces, fig. 127.

Example. Hedysarum.

Class 2. AGGREGATI.

Fruit Aggregate. Ovaria strictly simple; more than a single series produced by each flower.

128

7. *Etærio*, ovaries distinct; pericarp indehiscent, either dry upon a dry receptacle, as Strawberry, or fleshy upon a dry receptacle as Rubus, fig. 128.

8. *Syncarpium*, ovaries cohering into a solid mass, with a slender receptacle.

Example. Magnolia.

9. *Cynarrhodum*, ovaries distinct, pericarp hard, enclosed within the fleshy tube of the calyx.

Examples. Rosa, Calycanthus.

Class 3. SYNCARPI.

Fruit compound. Ovaria compound.

Sec. 1. Fruit Superior.

A. Pericarpium dry.

10. *Caryopsis*, one celled, one seeded, superior, indehiscent,

dry, with the integuments of the seed cohering inseparably with the endocarpium, so that the two are undistinguishable.

Examples. Wheat, Barley, Maize.

11. *Regma*, three or more celled, few seeded, superior, dry, the cells bursting from the axis with elasticity into two valves. The outer coat is frequently softer than the endocarp, and separates from it when ripe; such regmæ are drupaceous. The cells of this kind of fruit are called *cocci*.

Example. Eupohrbia.

12. *Carcerulus*. Many celled, superior; cells dry, indehiscent, few seeded, cohering by a common style round a common axis.

Examples. Tilia, Tropæolum, Malva.

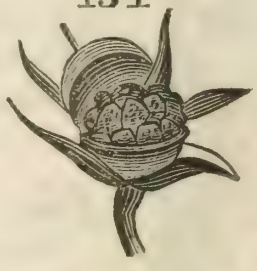
130

13. *Samara*. Two or more celled, superior; cells few seeded, indehiscent, dry, elongated into a wing like expansion, fig. 130.

Examples. Fraxinus, Acer, Ulmus.

14. *Pyxidium*. One celled, many seeded superior or nearly so; dry, often of a thin texture, indehiscent, by a transverse incision, so that when ripe the seed and their placenta appear as if seated in a cup covered with a lid, fig. 131.

131



Example. Anagallis.

15. *Conceptaculum*. Two celled, many seeded, superior, separating into two portions, the seeds of which do not adhere to marginal placentæ, but separate from their placentæ, and lie loose in the cavity of each cell.

132

133

Examples. Asclepias. Echites, fig. 132.

16. *Siliqua*. One or two celled, many seeded superior, linear, dehiscent by two valves separating from the replum; seeds attached to two placentæ adhering to the replum, and opposite to the lobes of the stigma, fig. 133.

17. *Silicula*, this differs from the latter in nothing but its figure, and in containing fewer seeds, it being short and broad.

Examples. Thalspi, Lepidium.

18. *Ceratium*, one celled, many seeded, superior, linear, dehiscent by two valves, separating from the replum; seeds attached to two spongy placentæ, adhering to the replum, and alternate with the lobes of the stigma.

Example. Corydalis.

19. *Capsula*, one or many celled, many seeded, superior, dry, dehiscent by valves, always proceeding from a compound ovarium. The valves are variable in their nature; usually they are at the top of the fruit, and equal in number to the cells; sometimes twice the number; occasionally they resemble little pores or holes below the summit, fig. 134 represents two forms of the capsula.

134

20. *Amphisarca*, many celled, many seeded, superior indehiscent; indurated or woody externally, pulpy internally.

B. Pericarpium fleshy.

21. *Tryma*, superior, by abortion, one celled, one seeded, with a two valved indehiscent endocarp, and a coriaceous, or fleshy valveless sarcocarp.

Example. Juglans.

22. *Nuculanium*. Two or more celled, few or many seeded, superior, indehiscent, fleshy, of the same texture throughout, containing several seeds.

Example. Grapes.

23. *Hesperidium*, many celled, few seeded, superior, indehiscent, covered by a spongy separable rind, the cells easily separable from each other, and containing a mass of pulp, in which the seeds are imbedded.

Example. Orange.

Sec. 2. Fruit Inferior.

A. Pericarpium dry.

24. *Glans*, one celled, one or few seeded, inferior, indehiscent, hard, dry, proceeding from an ovarium containing several cells, and several seeds, all of which are abortive, but one or two, seated in that kind of an involucrum called a cupule, fig. 135.

135

Examples. Quercus. Castanea.

25. *Cypsela*. One seeded, one celled, indehiscent with the integuments of the seed not coher-

137

ing with the endocarp; in its ovarium state evincing its compound nature by two stigmas; nevertheless unilocular and having but one ovulum.

Examples. Compositae, fig. 137.

26. *Cremocarpium*, two to five celled, inferior; cells one seeded, indehiscent, dry, perfectly close at all times; when ripe separating from a common axis.

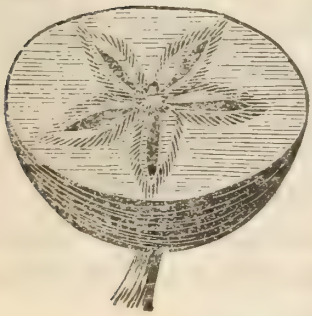
Example. Umbelliferae,

27. *Diplotegia*, one or many celled, many seeded, inferior, dry, usually bursting, either by pores or valves.

Example. Campanula.

B. Pericarpium fleshy.

139



28. *Pomum*, two or more celled, few seeded, inferior, indehiscent, fleshy; the seeds distinctly enclosed in dry cells, with a bony or cartilaginous lining.

Examples. Apple, Crategus, fig. 139.

29. *Pepo*, one celled, many seeded, inferior, indehiscent, fleshy; the seeds attached to parietal, pulpy placentæ. This fruit has its cavity frequently filled at maturity with pulp, in which the seeds are imbedded, their point of attachment however is never lost.

Examples. Cucumber, Gourd, Melon.

140

30. *Bacca*, many celled, many seeded, inferior, indehiscent, pulpy, the attachment of the seeds lost at maturity, when they become scattered in the substance of the pulpy.

Example. Ribes, fig. 140.

31. *Balausta*, many celled, many seeded, inferior, indehiscent, the seeds with a pulpy coat, and attached distinctly to their placentae.

Example. Pomegranate.

Class 4. ANTHOCARPI.

Collective fruits.

Fruit of which the principle characters are derived from the thickened floral envelops.

32. *Diclesium*, Pericarpium indehiscent, one seeded, enclosed in an indurated perianth.

Examples. Mirabilis and Salsola.

33. *Sphalerocarpum*, Pericarpium indehiscent, one seeded, enclosed within a fleshy perianth.

Examples. Taxus, Blitum.

34. *Syconus*, a fleshy rachis, having the form of a flattened disk, or of a hollow receptacle, with distinct flowers and dry pericarpia.

Example. Ficus.

141

35. *Strobilus*, an amentum, the carpellae of which are scale-like, spread open, and bear naked seeds; sometimes the scales are thin with little cohesion; but they often are woody, and cohere into a single tuberculated mass.

Example. Pinus, fig. 141.

36. *Sorosis*, a spike or raceme converted into a fleshy fruit by the cohesion in a single mass of the ovaria and floral envelops.

Example. Morus.

Seed.

115. The *seed* is a perfected, impregnated ovule. No sooner has the influence of the pollen been felt by the ovule, than various changes commence; the foramen closes up, the integuments harden, the heretofore pulpy substance becomes consolidated. The most material change that takes place, however, is the appearance of a new body, called the *embryo*.

The *face* of a seed is that part of it parallel with the placenta, or when the chalaza is present, this organ with only few exceptions, runs over the face. The opposite surface is the back.

116. The parts of the seed demanding our attention are the *covering*, *hilum*, *raphe*, *chalaza*, *embryo*, and *albumen*.

The *integuments* or coverings of the seed are subjects of much discussion, both as to their number and constitution. The diversity of opinion on the subject, originates, no doubt in a great measure from the change they undergo, from the transformation of the ovule into a seed. One would naturally suppose that the integuments of the seed would be the same as those of the ovules. But this is certainly not the case in many instances. Three have been named by different writers, corresponding to the three layers of the ovule: but the

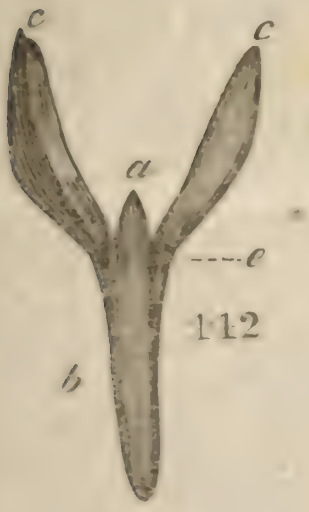
coats of the seed are not always the same as those that covered the ovule. The outer covering is called by De Candolle, the *testa*, the second the *sarcodermis* the inner the *endopleura*. Much might be said of the origin of these integuments, and the changes they undergo in development, but it would be of little interest to the student commencing the subject. The testa presents a great variety of appearances in different plants. In some cases it is smooth and polished, in others rough and irregular, marked by dots and projecting points, in some, it is covered with *hair* as in the cotton and Epilobium, which it is called *coma*, in others it is furnished with wings, as in the Gladiolus and Bignonia. In some it is ribbed, in others it is pitted and marked by irregular depressed lines.

117. The *hilum* is the point by which the seed is attached to the placenta ; it is frequently distinguishable by being of a different color, and having the appearance of a scar. The hilum is always the base of the seed.

118. The terms *raphe* and *chalaza* have the same application in the seed as in the ovule. In orthotropous and campulitropous seeds, these parts are not observable, since the chalaza is coincident with the hilum, and as the raphe is the bundle of vessels conveying nourishment from the hilum to the chalaza, the necessity of its development is superseded by the contact of these parts. The raphe is easily observed on the seeds of the Apple and Orange, being an elevated ridge on one side, and in the orange the situation of the chalaza is distinctly marked by a small dark colored spot. The raphe does not always consist of a single bundle of vessels, but ramifies on the surface of the seed, as may be seen by the veins on the surface of the Almond, which are ramifications of the raphe.

119. The *embryo* is the product of the action of the pollen. If the ovule be dissected soon after impregnation, there will be found within the nucleus and contiguous to the foramen a minute speck, opaque and yellowish, which enlarges by the absorption of the surrounding fluid ; this fluid is the *amnios*. The minute speck becomes in its enlargement a distinctly organized body, and assumes in time the form of an embryo plant. The embryo consists of three parts, the *radicle*, *plumula*, and *cotyledon*, some add a fourth a *cauliculus* or *neck*. The *radicle* becomes by development the *root* or descending axis of the plant, and the *plumula* the ascending axis or stem. The *cotyledons* are to be the earliest leaves of the plant. The *cauliculus* or *neck* is the imaginary point of separation of the plumula from the radicle. Fig. 142, represents an embryo

of a dicotyledon, *a* the plumula, *b* the radicle, *c c* the cotyledons, *e* the cauliculus or neck. Lindley gives the following account of the germination of the monocotyledonous seed. In germination the upper end swells and remains within the testa, the



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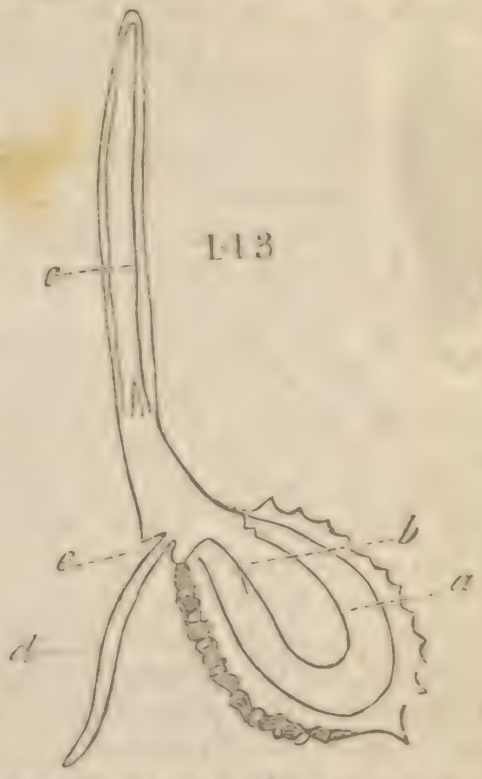

113

lower lengthens and opens at the point, and emits one or more radicles: and a thread like green body is protruded from the upper part of the portion which is lengthened beyond the testa. Here the portion remaining within the testa is a single cotyledon, fig. 143, *b*, the body which lengthens producing radicles from within its point is the cauliculus and the thread like protruded green part is the plumula, fig. 143, *c*.

120. This mode of germination it will be readily observed is very different, from what takes place in dicotyledons. In these the radicle appears directly from the surface, and the cotyledons are outwardly developed, while in the monocotyledons the radicles are "emitted from within the substance of the radicular extremity," and the cotyledon remains within the testa. The radicle of the monocotyledon, is enclosed within a sheath which it perforates in its elongation, and issues from between its lips as seen in fig. 143, *e*. *d* being the radicle. This sheath Mirbel called a *coleorhiza*, and Richard proposed to substitute *Endorhizae*, for monocotyledons and *Exorhizae*, for dicotyledons, thus founding the distinction of

the two great classes of flowering plants, on the fact that the radicles of one were enclosed within a sheath, while the radicles of the others were destitute of such a covering.

121. From the above description there are of course some exceptions, but all of which may be reduced to the common type. A slight variation is common, in which the plumula is distinguishable from the other parts and lies within a minute cleft near the base of the embryo, from which it issues on the commencement of germination. Fig. 144, represents an embryo of one of the grasses; *a* the cotyledon, *b* the radicle and *c* the fissure, in which the plumula lies.

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122. The embryo instead of being surrounded by the albumen, often lies on one side near the base and in direct contact with the testa. On the side next the testa, a slit is observed like the one above described, and if this embryo be divided vertically there will be discovered within small rudimentary leaves proving this to be the plumula. That part of the embryo lying between this and the albumen, is the cotyledon and a little below this, and on the opposite side in some species, as the wheat, is another similar body which is much smaller, but it is generally admitted to be of the same nature, thus proving that plants strictly conforming in every other respects to those called monocotyledons, have two cotyledons; but in all such cases the cotyledons are alternate and never opposite. The embryo of the Pine, although reckoned among the dicotyledons, has several cotyledons; but these are opposite forming a whorl. The distinction made by this arrangement of the cotyledons, being alternate in Endogens, and opposite or verticillate in Exogens, will always be a guide in determining to which an individual should belong. An equally sure mark of distinction is the mode of germination whether of the endorhizal or exorhizal manner.

123. The *albumen* when present is a substance surrounding the embryo, and is supposed by some to be the solidified amnios. It varies remarkably in consistence and appearance, sometimes soft and fleshy, at others hard and bony. In size it varies from an exceedingly small quantity as in the grasses, to the amount of several ounces in the cocoanut. It is sometimes perforated by dry cellular tissue, in which state it is said to be *ruminated*.

To determine the several parts of the seed which we have above defined, and the position they occupy in reference to each other is of great practical importance in descriptive

botany, and constitutes one of the most important subjects of the student's attention.

124. We have above remarked that the base of the seed was its point of attachment to the placenta, or that the hilum was always the base. One would naturally suppose that the opposite point would be the apex; but this is not generally the case. In orthotropous seeds, only, does the real apex correspond with the geometrical apex. In campulitropous seeds the apex of the seed is nearly in contact with the base, the axis of the ovule having been doubled on itself, thus bringing the real apex in close proximity to the base. It is very common for the surfaces of seeds, particularly of minute ones, to be marked by lines of various kinds, sometimes barely lines of different color, at others by ridges or depressions, and in others by dots, and in some by regularly arranged tubercles. In all these cases the point of their divergence is the hilum or base, and the point of their convergence the apex, so that by this means the base and apex of the seed is often determined, when it would be difficult to do it by any other. Having determined the foramen, base, and chalaza of a seed, which may generally be done, by simple inspection, the position of the interior parts is with certainty known. It has been demonstrated that in nearly every case the radicle points towards the foramen, and the plumula towards the chalaza. In orthotropous seeds, therefore, the embryo is inverted, that is the radicle points upwards; in campulitropous the embryo is curved; in anatropous the embryo is erect, and so in all cases, the mycropyle being taken for the radicle and the chalaza when present, and the hilum when the chalaza is not found for the plumula, the true position of the embryo is always determined.

125. The embryo answers most important purposes in classification, since the whole vegetable kingdom has been divided into three great classes founded on the varieties of structure of the embryo. There have been found three varieties of embryo, Monocotyledonous, Dicotyledonous, and Acotyledonous, and it has been observed that the vegetables arising from these differently constituted embryos are distinct and peculiar in their constitution and mode of growth.

126. Fig. 142 exhibits the dicotyledonous embryo, the different parts of which have been already pointed out. The growth of this kind of embryo produces our forest trees, and all vegetables having a distinct bark and pith. But, as above remarked, it has been discovered that there are vegetables with the above characteristics, whose embryos are unlike the one above described, some having numerous cotyledons, others but one,

and others none. These apparent variations have been sufficient to induce some Botanists to reject entirely this classification, but we believe on very insufficient grounds, since by careful observation nearly all these apparent discrepancies may be reduced to a common principle; and even if they could not be explained at all, the foundation of the system would be broader and firmer than any other proposed by the objectors to this. Could we expect that the many thousand different species of vegetables varying almost infinitely in their various parts could be reduced to three actual, invariable types? It would be requiring of this system what has never been attained in any other.

127. Orders in which more than two cotyledons are found are the Coniferæ, in which they vary in number from two to more than twelve; in Boragineæ and Brassicaceæ and some other orders there are four. In all these cases the cotyledons are opposite. In the Horse-chestnut, there is apparently but one cotyledon. Prof. Lindley says, that by dissection there is a slit which indicates the division between the two bases of a pair of opposite confluent cotyledons. Some such modification doubtless is the cause of all the variations from the common type.

128 There are other cases in which no cotyledons exist. The Cuscuta is an example of this kind, but if the cotyledons are leaves, we should not expect to find cotyledons in this genus, since it has no leaves. There are other cases in which it is said no cotyledons are discernable, but by more accurate observation the cotyledons are found to exist in a rudimentary state, the radicle seeming to be developed at their expense.

The monocotyledonous embryo is very different in its structure from the preceding. It is a homogeneous, cylindrical body, tapering at both ends, with no distinction of radicle, plumula or cotyledon.

CHAPTER IV.

FUNCTIONS OF THE ROOT AND LEAVES—ORIGIN OF WOOD.

129. In the preceding chapters we have described the various organs which compose the vegetable in its most perfect state, but we have considered them, with few exceptions, simply as they present themselves to the eye, without supposing them possessed of life, or considering them in their combined action

in performing the various operations peculiar to organized beings. We have seen that the whole vegetable kingdom, however various in form and constitution, had its origin, at least, in minute visicles. We have also seen that all the organs of reproduction and nutrition, are simple modifications of leaves. Who can fail to admire the wisdom of that Being, who could construct with materials so simple, the endless variety of vegetable organs, and make them yield products of every variety from the blandness of water to the most powerful agents; and to afford nutriment to men and animals, and deposit cotemporaneously and contiguously the most virulent poisons!

Our next object is to consider plants as living beings, and so far as possible to explain the various phenomena connected with them as such.

Section 1. *The Root.*

130. The first organ that appears in the germination of a seed is the root. It bends downwards, and soon commences the proper functions for which it is intended, that of absorbing nourishment from the medium which it penetrates, and giving support to the plants. These seem to be the only functions which the root performs. It lengthens by additions to its extremity, which always consists of an enlarged portion of cellular tissue, before described under the name of *spongiole*. Through this extremity all the nourishment of the plant which is absorbed from the soil passes, as we demonstrated in a former section.

131. *The root has no power of selecting its food.* This is rendered evident by making various solutions, and watering the plant with them. It absorbs them indiscriminately; the only conditions being that they do not act on vegetable substances, and that they be in a fluid state. The contrary of this has been the opinion in former times. It has been thought that the root not only had the power of selecting appropriate food for the plant, but also of searching for it. The experiment of planting a Strawberry in a sandy soil, surrounded by rich earth, but not coming in contact with it, when it was found that the roots immediately sought the rich earth, was considered conclusive on this point. But the explanation of this phenomenon is easy without having recourse to any power or instinct on the part of the root for seeking nourishment. The influence of the rich soil was felt by the roots, although not in contact, and they became stimulated

by its action. There are other cases in which roots seem to be endowed with the power of seeking nourishment. An example is mentioned by Lord Kaimes of a Plane tree standing upon a ruined wall in Ireland; and when its nourishment was exhausted it sent down roots to the earth, a distance of ten feet, and continued its existence by this act, prompted, apparently, by self preservation. We have seen vines growing in very rich, moist soil send down roots four and five feet long to the earth; but in those cases it was at a curve downwards of the stem, so that the descending fluid must rise to reach the roots. In all these cases we believe that it is the effect of gravity opposed to vital action, rather than to any voluntary or determining power of the plant. In the corn we see roots put forth from the lower nodes of the stalk, and particularly in those that are luxuriant, and in seasons of abundant moisture, proving from their origin and the circumstances under which they occur, that it is the accumulation of descending sap that causes their development.

132. Although roots do not possess the power of selecting their appropriate nourishment, or rejecting what is deleterious, yet they have the power of returning to the soil the noxious ingredients which they absorb. This is shown by an experiment of Macaire recorded by several Botanists, of a plant having half its roots immersed in a jar containing a solution of acetate of lead, and the other half of the roots in one containing pure water; in a short time acetate of lead was found in the jar of pure water, showing that the plant had taken the lead into its system, but had thrown it off again, as unfit for assimilation. It has long been known that roots give off peculiar substances, but it has not till recently been considered a universal and necessary function of plants. There is no doubt, that it is as necessary to the healthy action of the various vegetable organs that the deleterious matters, or such as are unfit for the particular species, should be ejected from the system, as that excrementitious matter should be voided by animals.

133. It has long been known to agriculturalists, that the same crop will not flourish on the same ground for many years in succession: hence they adopt the rotation of crops. The above principle is a plain reason why this is the case. Wheat for instance produces an exudation from its roots which is deleterious to this plant, and if wheat be sown year after year on the same soil it becomes impregnated with a substance injurious to wheat, and the proper nutriment becomes exhausted. This excretion of wheat may be appropriate food for cotton or tobacco, and of course these crops may flourish where

wheat would not grow; hence in transplanting trees, the above principles would guide us to seek plants of a different family from those that previously occupied the ground. It might perhaps be thought that trees would vitiate the soil in which they grow so as to become their own destroyers, but this is prevented by the arrangement, that the roots absorb only by their extremities, and these are constantly lengthening and of course changing their position and coming in contact with new earth. The nature of the excreted substances are of course as various as the families of plants. "Leguminous plants produce a substance analogous to gum with a little carbonate of lime; grains a minute quantity of matter containing certain alkaline and earthy muriates and carbonates, but very little gum;" others the bitter principle and substance resembling opium, containing tannin and other salts. Our space forbids specifying the numerous excretions of the different orders, which have been determined. The practical application of these principles is important to the Agriculturalist and Horticulturalist; it teaches the first that the greater the variety of crops he can produce on his plantation, the better they will be, and the less likely to be injured by attacks peculiar to the crop. It teaches the latter the benefit, if not the necessity, of changing the compartments of his garden in succession for different productions, and the necessity of changing the earth in pots and boxes occasionally, if he expects plants to continue to thrive.

134. We have mentioned before that the root always descends in its course of development, unless obstructed by physical impediments. Numerous experiments have been made which strikingly exhibit this vital impulse. To Dutrochet, more than to any other man, is the world indebted for placing this subject in its present interesting position. In several memoirs he has discussed the subject in its various connections, and from his numerous experiments we arrive at the conclusion that, Quantity of matter seems to exercise the most powerful influence in controlling the direction of the root. When the root has its situation naturally in the earth it descends perpendicularly to its surface. Previous to his investigations various hypotheses were abroad to account for the uniform direction of the root and stem; but all were unsatisfactory. If seeds are permitted to sprout in a box, and after the plumula and radicle are developed in their common directions the box be inverted, the root will change its direction downwards, and the plumula upwards, and if they are permitted to sprout in a tube in which they cannot turn after inversion, they will as-

sume a spiral form. The cause in these cases is made plain by a curious experiment contrived by Dutrochet. It was found that the Mistletoe had the same impulse towards the center of the branch of a tree on which it grows, that most other plants have to the center of the earth, and it was also found that the Mistle toe might be made to germinate on a thread so small that it would exercise no influence over the direction of the root. This he did, and then fixed it to a fine needle, and had it accurately balanced so as to turn like a compass needle with the slightest force. He then placed near the radicle a piece of wood and covered the whole with a glass, and in process of time the radicle was seen to turn directly towards the wood, and that too without moving the needle; showing that the quantity of matter controlled the direction of the radicle, but by the exercise of no power with which we are acquainted. It could not have been by attraction, for then it would have produced a movement of the needle. It seems to be an exercise of power over the vital energies in producing the turning of the radicle in that direction. The earth no doubt exercises its influence in the same manner. This influence, however, has been counteractedby the application of agents in an unusual manner. Prof. Schultz is said to have succeeded in reversing the growth of plants by planting them in moss, and so arranged that the light which they received was the solar rays reflected from a mirror from below upwards. Under such circumstances, it is said, the roots take their directions upwards, and the stems downwards; similar experiments have not succeeded in the hands of others.

Notwithstanding such experiments *may* succeed, we may nevertheless draw the conclusion, that all roots direct themselves perpendicularly to the surface of the body on which they naturally germinate; if they are parasites they will be perpendicular to the surface on which they grow.

Color seems to exercise an important influence in the direction of organs; if they are of deep color they ascend, if colorless, or of a pale color, they take a descending direction. Roots if they become green will then ascend, or turn towards the light, if placed in circumstances to have the light come to them in only one direction.

Section 2. *Function of Leaves.*

135. From the *structure* of leaves, we should be led to suppose that they perform an important part in vegetation. They

have been compared to the lungs of animals, but they perform much more for the plant, than this comparison would indicate. They are not only the organs of respiration, but also of digestion and nutrition. They perform in every respect for vegetables what are performed by the lungs and stomach, and the whole digestive apparatus, in animals. They receive the crude sap from the roots through the stem and elaborate it by exposing it to the action of the atmosphere, throwing off the superfluous moisture, decomposing water and carbonic acid, sending down the deleterious substances to be voided by the roots. They send immediately downwards the materials of the albumen and liber, and nourish with this elaborated food the contiguous parts.

That the nutrition of a plant depends upon its leaves is abundantly proved by depriving a plant of these organs through a season, and it withers and dies. It does not die immmediately, since it posses es the power of putting forth new leaves which soon come into action and supply imperfectly the places of those removed; but if it is deprived of its leaves through the season, its power of putting them forth becomes exhausted and all functions cease.

The presence of cotyledons also shows the necessity of leaves to prepare food for the embryo. If the cotyledons be removed the seed seldom germinates, and if it does, it is in a sickly state. The structure of the leaf shows its adaptation to the purposes of respiration. We now proceed to describe some other of its functions.

136. By what we have called crude sap, we do not mean that it is not changed at all in its ascent through the root and stem, but that it is unfit for assimilation, until it has passed through the leaves. Prof. Emmons published an article in the American Journal of Science, for 1834. vol. 26. p. 99, in which he argues against a double circulation in vegetables, and the effect of the leaves in elaborating the sap. From the well known talents of the Prof. and our own estimation of his exalted abilities on any subject to which he turns his attention, we have taken uncommon pains to settle this question in our own mind, and we have come, by various experiments, to the conclusion, that all the functions we have attributed to the leaves are certainly performed by them. As the Professor throws out his ideas in the form of hints, we should be gratified to know whether future observations confirmed his opinions. We have seen nothing from his pen on the subject since the article referred to above.

137. It would be an important point to determine the real state

of the sap as it enters the leaves. That it is changed in its ascent is certain; of this we have often convinced ourselves by making an incision in the spring of the year near the root of a Birch, and sap, with very little taste, will be obtained, but by making the incision several feet high the sap is bitter, and the bitterness increases with the elevation of the incision. Sugar makers (from the Maple) know that the higher they tap the trees the sweeter is the sap.

The sap in this partially altered state, which is owing to chemical changes, enters the leaves.

138. The first action of the leaves is to get rid of the superfluous water in which its food is dissolved. Whether this is any thing more than simple evaporation we are not prepared to say, yet we believe the plant has partial control, at least, over the quantity. The construction of the stomates plainly indicates this. It is influenced by the same causes which govern common evaporation. Under the direct influence of the sun's rays it is most rapid; in the diffused light of day it is less, and in the dark it almost ceases.

The quantity of fluid given out by plants is in some cases very great. We may convince ourselves of this by holding a glass near the under surface of a vigorous leaf of the vine, and it will soon be covered with moisture, and in a little while it will accumulate in drops and run off the plate. Hales found the evaporation of a sunflower to be one pound and four ounces, and a cabbage one pound and three ounces in a single day, and estimates the evaporation of plants to be seventeen times greater than that of animals.

139. The next and most important function of leaves is the decomposition of carbonic acid. It is only by the performance of this function by the leaves, that the solid parts of vegetables are deposited. Any cause which arrests this operation immediately renders the plant sickly and its peculiar secretions cease to be deposited. Light is absolutely essential to the performance of this function of the leaves. In the dark no carbon is deposited and no oxygen is liberated.

DeCandolle says, "If two plants are exposed, the one to darkness and the other to the sun's rays, in a close vessel and in an atmosphere containing a known quantity of carbonic acid, and are removed at the end of twelve hours, we shall find that the first has diminished neither the quantity of oxygen nor carbonic acid; and that in the second, on the contrary, the quantity of carbonic acid has diminished, while the quantity of free oxygen has increased in the same proportion." This experiment shows beyond doubt the function

of the leaves in decomposing carbonic acid, and that the light of the sun is necessary for its operation.

The same author instituted another ingenious experiment to show the absorption of carbonic acid by the roots and its subsequent decomposition. He filled a cistern, and an inverted bell glass, with distilled water, the glass having a sprig of mint floating in it; in the same cistern was placed another bell glass containing carbonic acid. The surface of the water was covered with a stratum of oil to prevent the access of atmospheric air. The whole was then exposed to the direct action of the sun. The carbonic acid diminished daily, while the glass containing the mint had acquired a quantity of oxygen exactly equal to the loss of carbonic acid. A similar plant placed under similar circumstances with the exception of the jar of carbonic acid, disengaged no oxygen, and at the end of twelve days, the time the experiment continued, commenced to decay, while the other one was in good health. No farther proof certainly could be required to establish any fact than these afford in establishing the function of the leaves in decomposing carbonic acid, by the aid of the sun's light.

It is a singular fact that such experiments will not succeed unless exposed to the direct action of the sun's rays. Although these operations take place in some degree in plants growing in shaded places, yet when placed under circumstances for experiment, they require the direct action of the sun to perform this function.

140. That the carbon has been deposited in the plant is also proved by exposing plants to the action of an atmosphere that contains carbonic acid, and similar ones to an atmosphere that contains none; the former will increase in carbon, while the latter will not. The two principles established by these experiments are of much practical importance. They teach us that the presence of carbonic acid is absolutely necessary for the growth of vegetables, and that if we expect the full and perfect development of plants they must have the direct action of the sun's light. To secrete all the peculiar products in perfection these circumstances must conspire. The gardener is well aware of these facts in practice. To *prevent* the deposition of unpleasant products, which are natural to the plant, he covers the stem of the celery, and it deposits little except the simplest tissue, and becomes loaded with nearly insipid fluids; the sterner juices of the plant previously deposited becoming diluted, so that it is a healthful and agreeable food. This plant, uncultivated in the manner it is, yields

substances exceeding rough and acrid, and but little corresponding to the mild, sweetish stems produced by the gardener's care. This, however, it must be observed, is an immature state of the plant; and the principle of the deposition of carbon by light is used, although empirically, in converting an otherwise useless weed to an article of delicacy. We might multiply examples, but one is sufficient to illustrate the principle, and we may make the remark, which the cultivator would do well to bear in mind, that when plants yield naturally agreeable products the more light they receive the better they will be; but when the products, in a state of too great concentration become acrid, shade will make them more palatable. Of the latter of these is the Radish, and of the former the Potatoe. Hence the potatoes are much drier and contain more nutritive matter, which have been grown on open land exposed to the sun, than those grown in orchards, which is often the case. The truth of these principles is strikingly illustrated also in the geographical distribution of plants. Those of high latitudes, growing through a summer of a few weeks or months, possess few decided properties. They yield the simplest vegetable products, possessing but few properties not common to all vegetables. But as we approach the equator, the properties become more decided, odors more varied and pungent, fruits more delicious, medicines more powerful and efficient, poisons of the most fatal character, till we arrive at the equatorial regions where all these products, in all their variety, arrive at perfection.

141. Forest trees are affected very much by the same principles. The wood of dense forests is known not to be as firm, or as durable as that of trees growing in open grounds. We see also the effect of these principles in the turning of plants towards the light when it comes to them in only one direction. The side next the light deposits its carbon, and becomes firmer, harder, and of course contracted, while the other side remains turgid with unassimilated fluid. The plant of course bends towards the light, not from any attraction it has for it, but from the influence the light exerts upon it. We see the same exemplified in the growth of forest trees. When the forest is dense, light being received entirely on their tops, trees stretch upwards. the lower branches decay, and thus forming tall, straight cylindrical trunks, with the branches near their summit. Trees in open fields never grow as tall as in forests, but they have a greater number of branches, and nearer to the earth; and the reason is plain from the foregoing remarks; they receive the direct rays of the sun at every different po-

sition it assumes through the day, thus having no propensity to development in any particular direction by the action of the light.

142. Another function of the leaves is that of absorbing and giving out oxygen. That plants yield oxygen to the atmosphere has long been known, and that they absorb oxygen during the night is not a very recent discovery. Our preceding remarks render it unnecessary to add much to our observations on plants giving out oxygen in respiration, as it results mostly from the decomposition of carbonic acid; but we are unable to account for the constitution of various vegetable products without supposing the decomposition of water, from which the vegetable derives the hydrogen used in the formation of these substances. Oil for instance, is composed of 1 atom of oxygen, 11 of hydrogen, and 10 of carbon. Now no substance, that enters as food into the plant can yield this great amount of hydrogen but water. This decomposition of water, no doubt, in a great measure, takes place in the leaves, for volatile oils are very commonly found in these organs, and when they are not found in the leaves, they often exist in cavities with apparently no secreting bodies for their formation in the situations in which we find them. In many cases, at least, it seems probable, from these considerations, that they are generated in the leaves, or in parts performing the same functions. The bark, in certain states, is capable of performing the same operations as the leaves.

143. The absorption of oxygen takes place in the night. We may convince ourselves of this by confining a plant during night in atmospheric air, and the oxygen will be perceptibly diminished. This oxygen unites chemically with substances contained within the leaves, and probably with carbonaceous food not in the form of carbonic acid, and it would seem that only in this state is it fitted for assimilation. The oxygen is immediately given back to the atmosphere on the return of day. The quantity of oxygen absorbed by plants is too small to have any effect on the health of animals by its abstraction.

144 Besides absorbing and giving off oxygen, plants constantly, in healthy action, give off a small quantity of carbonic acid, both day and night. It has been supposed that this was the true and only effect of vegetable respiration on the atmosphere, and that the absorbing and giving off oxygen and decomposing carbonic acid and water, belonged to digestion. This we are disposed to believe is the true state of the case. From this it would result that the respiration of vegetables vitiates the atmosphere as does that of animals; but the effects of their di-

gestion abundantly compensates not only for the carbonic acid, which they yield to the atmosphere, but also for the vast amount constantly given out by animals, and that produced by combustion. They not only yield oxygen, but they take the noxious gas and decompose it, and retain the carbon and return to animals the vital air. Thus the two great kingdoms of animated nature mutually yield to each other its vital fluid. Were it not for this compensative arrangement we see no other result, constituted as the beings of this globe now are, that could happen, but that the atmosphere would become so vitiated as to be unfit for the support of animal existence. How beautifully they now operate. The expelled carbonic acid, which is poisonous to the animals, which throw it off in vast quantities, is taken up by the vegetation as the most healthful and appropriate food for them, and the oxygen which they do not require by their constitution gives life to man.

That very important operations take place in the leaves is conclusively proved by many observations on the leaves of different plants at different periods of the day. Hayne found the Bryophyllum calcynum to be acid in the morning, tasteless at noon, and bitter in the evening. The same is true of many other leaves, and some will even redden litmus paper in the morning, but produce no effect upon it at any other part of the day.

Section 3. *Origin of the Wood.*

145. We might occupy pages in the various discussions which have been carried on concerning the origin of the wood. From the time of Linnæus to the present, various theories have been formed and advocated with spirit; but the discovery of new facts has compelled, in some cases, the authors to yield their favorite opinions and fall in with views more in accordance with what at least appears to be nature's operation. We shall not occupy our space on exploded theories, but proceed directly to lay before the student the one which seems to bid fair to supplant all others.

This theory supposes two distinct simultaneous systems of growth: the cellular and fibro-vascular, of which the former is horizontal, and the latter vertical. The cellular gives rise to the pith, medullary rays, and the remaining cellular substance of the wood and bark. The fibro-vascular system gives rise to the vascular portion of the plant. All the woody portion of the trunk are the roots of leaves imbedded in the cellular system by which they are confined. The buds differ from the

seed in no important respect. They send up the ascending axis in the form of a branch, and the descending axis in the form of vascular fibres, which united, form the stem and terminate in the earth, modified in some respect, by the cellular system, forming what, taken as a whole, is called the wood. The various varieties of wood are produced by the action of the cellular system. Of this we may be convinced by removing a ring of bark of one tree and supplying the place of the removed portion by a ring from a different tree, and the wood formed under the strange portion will be of the same kind as the tree from which it was taken, but the wood above and below will remain unaltered. The same is the case with grafts. The graft will always remain unaltered, while the wood of the stock remains unaffected by the graft.

146. The truth of the assertion that the wood is composed of roots of leaves is abundantly shown by all endogenous trees. Each bundle of woody fibre in the Yucca or Palmetto, may be traced directly to the base of a leaf, and if a root is the descending axis, each bundle must be considered a root proceeding from a leaf, and the stems as composed of innumerable roots bound together by the cellular tissue. No theory that has ever been proposed has explained, with any degree of satisfaction, the growth of Endogens, but this theory of DuPetit Thouars explains, with perfect simplicity, every variety of vegetable production.

In exogens we find abundant evidence of its truth. If the leaves be removed from the extremity of a branch, no increase of the branch will take place, except below a leaf, and the branch will die, down to the first leaf, and on the opposite side it will die lower down if the leaves are alternate. This fact shows, beyond doubt, that the production of wood depends on depositions from the leaves.

147. The case of Endogens before adduced, shows as clearly that the woody fibres are produced from the leaves downwards. Some uncommon examples are upon record, which go still further to confirm the position. In the Pandanus the stem near the ground is extremely slender; higher up it is thicker and gives out aerial roots, which act as props to the plant by entering the earth obliquely. The aerial roots are beyond doubt what would have composed a part of the stem, had they remained bound by the cellular substance into one cylinder, but from some cause they separate and subtract so much from the mass of the stem near the root. Prof. Lindley describes another instructive case on this subject in the Barbacenia from Rio Janeiro, recently discovered

It consists of a central portion similar to common endogens, but this column is surrounded by bundles of vascular fibres, the bundles having no connexion with each other, corresponding, in the opinion of the Professor, to the aerial roots of the Pandanus. We know of no other theory, which explains the putting forth of roots from buds when planted, as in the case of the Multicaulis. These will put forth roots immediately from the bud, and in all essential points agree exactly with the germination of the seed. A complete bud of a Multicaulis will germinate, when all the substance of wood and bark is removed, which does not enter into the composition of the bud. The vitality of most buds seems to be much less, and in some cases cannot be made to germinate at all when removed from the parent stock. Whence, we would ask, come the roots from a bud if they are not the direct production of the bud? We can conceive of no other solution to the phenomenon, and when the bud is removed from the parent, the fibres it would otherwise have sent through the trunk become proper roots at once. From the above theory we are cautioned against excessive pruning, where we wish to obtain substantial stocks; for all other things being equal, the growth of the body of a tree will be in direct proportion to the leaves, which of course, will be in proportion to the branches. If these are removed to a great extent, the growth of the tree is retarded, if not otherwise injured.

148. The *duration* of vegetables is exceedingly various. Some come forth during the darkness of a single night, and wither and die on the approach of day; others go through their different stages of growth to perfection in a few days, and disappear. Some require the length of several months for the same operation, and others of two years, while others still come to perfection only after several years, and then are continued in existence for indefinite periods. The latter is the case with forest trees. We see nothing, theoretically considered, opposed to the unlimited duration of Exogenous trees. Each year's growth may be considered a distinct individual having in itself all the elements for the production of a similar individual, which, when produced, has no necesssary dependence upon its progenitor; since each layer of any tree has been endowed during its time with all the productive functions of the individual. But to this unlimited duration of vegetables, nature offers impassible barriers. The action of the elements, the attacks of insects and larger animals, the exhaustion of the soil by other vegeta-

bles, the constant lengthening of the roots, making the circulation too extensive, are all causes constantly operating to prevent the duration of the most of forest trees beyond one or two centuries. But there are cases in which favorable circumstances have conspired to lengthen out the lives of particular individuals to as many thousands. Some trees of great age have become subjects of history. The celebrated Chestnut of Mount Etna has a circumference of 160 feet, and is called *castagno di cento cavalli*, the Chestnut of a hundred cavaliers, as it is said that when the Queen of Arragon was on her way to Naples she desired to visit Etna, and ascended the mountain with a hundred cavaliers—a storm coming upon them, they were all sheltered by the foliage of this collossal tree. This tree has been said to be several trees united, but more recent and accurate observations have proved it to have but a single root, and of course it is a single tree. Its age by any calculation must be that of many centuries. Some of the oldest Cedars of Lebanon are supposed to have an age of two thousand years. The Baobab trees of Africa, and the Dragon tree of Orotava are said to be even six thousand years old. Pliny believes there were trees in his time as old as the world, as he says they were, "*intacta ævis et congenita mundo*, untouched by age and brought forth with the world."

Means have been devised for the determining the ages of trees by the diameters, but they are so liable to error, that that they are unworthy of repetition.

CHAPTER V.

Section 1. *Fertilization.*

149. The subject of fertilization is one of much interest, from the singularity of the operations by which it is in some cases carried on, and the beautiful adaptation of the means to bring about this indispensable end.

All plants possess some apparatus for the production of seed, or of bodies which, independent of the parent will vegetate and produce the species. From the most simple Confervæ, with stems scarcely larger than films of silk, to the most perfect plants. The fact that some plants possessed two systems by whose conjoined action the fruit and seed were perfected, has been long known. The ancients were

acquainted with this fact in reference to the Date Palm. They discerned that in the blossom of one tree, rudiments of fruit existed, while in that of others no such rudimentary fruit was produced, but that the powder produced by the flower of the latter, must be sprinkled in the flowers of the other in order to the perfection of the fruit. The above and similar facts constituted all the knowledge of the ancients on the subject of fertilization; and it was not till the latter part of the seventeenth century that any thing like proper notions began to prevail. Ray, in England, and Malpighi, in Italy, were among the first who placed the subject in its true light. Their investigations led them to the conclusion that the "pollen was endowed with prolific power, and served to fertilize the seeds."

Within the last few years this subject has received the particular attention of the most distinguished philosophers, and the important facts which they have disclosed, constitute a proud triumph of their skill and sagacity, over the most hidden operations of nature.

150. The anther and its contents, the pollen, and the various parts comprising the pistil, we have already described. It will now be our object to trace the operations of nature in accomplishing the end intended by the production of these various parts.

The anther in its early stage, together with the pollen, forms a compact and moist body. After the flower expands, the anther matures; the pollen absorbs the fluid from the cells lining the anthers. These cells as we have before remarked, were proved by Purkinje to consist of the fibrous cellular tissue, and this tissue, when deprived of moisture, becomes exceedingly elastic, and the fibres then act as springs in bursting the anther. Now, Mirbel has demonstrated that during the perfection of the pollen, the fluid of this tissue is drawn by the endosmose of the pollen from it. The presence of this fluid is necessary to the perfection of the pollen and it is equally necessary that it should be drawn from the fibrous tissue, that it may perform its appropriate and necessary function of bursting the anther. What a beautiful provision for ensuring the due preparation of all parts, so that none might be prematurely or tardily performed! Under this organization the anther cannot burst till the pollen has drawn its perfecting nourishment; on the other hand the pollen cannot mature only by a means which ensures its immediate escape when perfected.

During this preparation of the pollen the pistil is under-

going important changes. The stigmatic surface assumes an irregular, granular appearance, becoming more lax in its texture, and secreting a viscid fluid, all of which is accomplished by the time the pollen is perfected. The pollen then falls upon the stigma, is made to cohere by this viscidity, and moistened by the secreted fluid.

151. After the grains of pollen have remained upon the moist stigmatic surface for several hours, the extine bursts at one or more points, and through the apertures the entine is protruded containing the contents of the pollen grain. These *pollen tubes* penetrate the lax tissue of the stigma, and make their way through the whole length of the style, to the ovule, and reach, and probably in all cases enter, the foramen. The remarkable exhibitions of design for accomplishing this object, are unsurpassed by any phenomena in nature, and the researches of Brown, Amici, and Brogniart, have laid open a field which cannot be viewed by a lover of nature, with any other feelings, than those of unmingled delight.

152. We have found the Hibiscus grandiflora the best example for tracing the pollen tubes of any plant, which we have examined in this respect By examining the plant during the day of the expansion of the flower, the pollen will be found in abundance on the stigmas, of which there are five, and tubes will be found to have projected from some of them, perhaps one only from some grains, and none from others. By the following day the tubes will have entered the stigma, and have passed down the conducting tissue of the style, and entered the placenta. The ovule of the Hibiscus is of the campulitropous kind, so that the foramen is of course brought round near to the placenta; and that the pollen tubes may have access to the foramen, the funiculus is extended beyond the hilum, so as to pass over the foramen, and thus afford a passage for the pollen tubes into it. Owing to the imperfections of our instruments during the flowering of the Hibiscus, we could not satisfy ourselves in tracing the tubes farther than to the placenta, though we believe we could discover them at the entrance of the foramen, at a short distance in which they were lost to our observation. We are obliged on this subject to give the observations of others, not having been able to verify in many points, the facts recorded, from not having in season possessed a microscope of sufficient accuracy and power, to exhibit the parts with satisfactory distinctness. Of the passage of the tubes to the placenta, and the molecular constitution of their contents, we can speak with confidence, but as to their course and modifications afterwards, we trust to the

observation of others. All botanists, who have investigated this subject, agree that the pollen tubes enter the ovule and come in contact with the sac of the amnios. The result produced by this contact, is thus given by Mr. Griffith, as quoted by Prof. Lindley, in his third Edition of the introduction to Botany, p. 343. "The pollen tube in first coming in contact with the sac of the amnios, in the *santalum album* becomes blended with it, without perforating the membrane. The molecular matter has at this time lost its locomotivity, and becomes aggregated into a grumous line, reaching from the apex of the sac to its base. Then a globular vessicle, containing mobile granules, appears at the apex of the sac, in communication with the grumous molecular line. About the same time, a distension of the base of the sac occurs, and a central cell is formed in it; by degrees the space intervening between the latter and the apex of the sac, becomes cellular and changes to a *suspensor*, having an embryo at that end which is next the base of the sac." The above is the action of the pollen tube in a single case, and although they may differ in some respects, yet the important points to be noticed and which are the necessary circumstances attending them, are *first* that the tubes come in contact with the sac of the *amnios; second*, that the tubes do not perforate the membrane; and *third*, that by the action of the contents of the tubes, an embryo is formed within the sac. These in substance, were the opinions of the first observers of the action of the pollen tubes, and are still those of the English, and some continental Botanists. But there are those, who present the phenomena in an entirely different light, and endow the different parts with as different functions. The German Botanists, Schleiden and Endleicher, are the most prominent advocates of the following theory, which is an abridgement of Schleiden's views as given by Lindley. The pollen tubes enter the ovule, and pass through the intercellular passages of the nucleus, and reach the embryo sac, which, being forced forward, is pressed, indented, and becomes the cylindrical bag which constitutes the embryo in this first stage of its development; and which consequently consists solely of a cell of parenchyma, supported upon the summit of the axis. This bag is therefore composed of a double membrane, (except the open radicular end,) viz: the indented embryo sac, and the membrane of the pollen tube itself. In Taxus, and especially in Orchis, he has succeeded in drawing out that part of the pollen tube from the embryo sac, which becomes the embryo, and that too, at a considerable advanced stage.

153. The student will observe from the above, that in Schleiden's view of the subject, the pollen tube becomes itself the vessel that contains the embryo, instead of the embryo being formed in the sac of the amnios; and it will also result from this view, that so far from this impregnation of the embryo *sac* coming from the pollen tube, the pollen tubes become themselves the subjects of this influence. This reverses entirely the order of things as they have been considered in all past times.

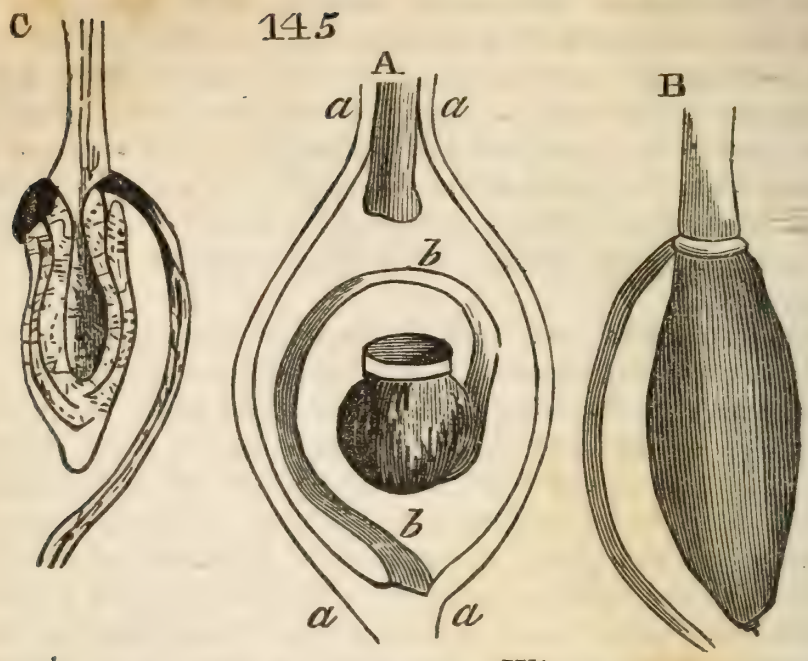
Schleiden advances three arguments for the proof of his position, when the tubes cannot be traced uninterruptedly from the stigma into the embryo sac. In some cases, the cellular substance of the nucleus is so firm and opaque through which the tubes pass, that the tubes cannot be traced through it; but the indentity of the embryo with the pollen tube, he infers. 1. From the constantly equal diameter of the latter exterior to the embryo sac, and of the former just within it. 2. The invariable chemical similarity of their contents, shown by the reaction produced by the application of water, oil of sweet almonds, iodine, sulphuric acid and alkalis. 3. In such plants as bear several embryos, there is always precisely the same number of pollen tubes.

154. The analogy drawn from the animal kingdom, as applied to the stamens and pistils, has long appeared to us a useless and incorrect one, and we have long since ceased to make allusions of this kind in our lectures on this subject. The production of spores in cryptogamic plants, and of buds or germinating points, in all plants; it seems to us that no such apparatus is needed, and a strong presumption that no such exists.

It seems to us much more simple, and the supposition leaves the vegetable kingdom unencumbered with ideas drawn from a department of nature from which it differs so greatly, and which tends to lead to error, to suppose that the germ of the future plant is produced in the stamen, and the development of the pistil affords it a place of deposit and nourishment.

155. Some different contrivances from those already mentioned for effecting the entrance of the pollen tubes into the foramen of the ovule, should not be omitted in this place. This object is effected in the following manner, in the Armeria vulgaris and Statice, as described in the Library of Useful Knowledge, Article Botany, p. 110.

Let the ellipse *a a*, fig. 145, A, represent a section of an ovary of this plant. From its base there arises an umbilical cord, *f f*, which curves after reaching about half the length of the cavity, and bending down upon itself again, turns partially



up, bearing an ovule at its apex. When very young the ovule is a sort of cup, the mouth of which is closed by a little cord, and is turned towards the apex of the ovary. From all access to the dome of the ovary the ovule is cut off, notwithstanding its position, by the cord which over against the apperture of the ovule, spreads into a kind of strap. It is from the point of the ovary *e*, that the stigma arises; and from immediately below their origin, a short cylinder projects down into the cavity of the ovary. Matters being thus arranged, the pollen falls upon the stigma, and pollen tubes are forced into its tissue and gradually find their way into the cylinder; at the same time the ovule lengthens, contracts at its aperture, and is brought near the cylinder, by the elevation of its umbilical cord; at last the strap is slipped aside, the cylinder lengthens, the ovule rises, and with its aperture embraces the point of the cylinder which is somewhat conical, and which is thus brought into contact with the nucleus. At this time the parts are in the position represented as in *B*, and if cut through longitudinally as at *C*, they will be seen to be placed in the most favorable position that can be imagined, for enabling the pollen tubes to enter the foramen of the nucleus.

156. After the discovery of pollen tubes, and the necessity of the pollen coming in contact with the moist surface of the stigma, in order to put them forth, it was thought that the impregnation of the Asclipiadeæ, and Orchideæ formed exceptions to the general manner of producing impregnation by their emission, since nature seemed to have prevented the

possibility of any such operation, but more recent discoveries show these plants to exhibit most beautiful examples of this arrangement.

In the Asclepiadeæ, the stigma is a fleshy, five-cornered disk, having a gland on each angle. To each gland there is attached a pair of yellow bags, containing the pollen and called *pollen masses*. These do not open, and the stigma has no secreting surface. In these circumstances, the impregnation of these plants offered an important problem for solution. Ehrenberg found that through one side, that next the stigma of these pollen manes, pollen tubes were emitted, and directly entered the stigma, and made their way to the ovary, as in other cases, thus showing the perfect agreement in this case, at least, with other phanerogamous plants. It has also proved more than probable, that similar arrangements accomplish the same end in Orchideæ In orthotropous plants, threads in some cases hang down in the cavity of the ovary through which the pollen can pass into the foramen. In other cases, the conducting tissue elongates so as to reach the foramen during the time of fertilization. In Euphorbia, the apex of the nucleus is protruded far beyond the foramen, so as to lie within a kind of hood like expansion of the placenta.

Section 4. *Fruiting.*

157. By fruiting we understand the changes the ovarium and its connected parts undergo in arriving at maturity. We have already noticed the changes which take place in the contents of the ovary. The changes of the other floral organs, in many cases, are no less prompt and distinct. The floral envelops soon wither, unless connected with the ovary; the stamen falls off, the pistil dries up or hardens when composed in part of the axis of the plant, and all the energies of the plant seem to be directed to the perfection of the fruit or ovary. That these changes are effected by the act of fertilization, may be made manifest by preventing the access of the pollen to the pistil, and the parts will for a much longer time remain unchanged. There seem to be two different courses taken in the perfection of different fruits. In one, the ovary becomes dry, hard, membraneous or woody as in the Poppy, Cantua, &c. In others, the ovary becomes fleshy, affording various agreeable articles of food, as apples, pears, peaches, mellons, &c. This has been supposed to depend upon the number of stomates on the surface of the ovary. In the dry one, the stomates were sufficient to permit the evaporation of all the

moisture while in the fleshy comparatively little evaporation took place from the small number of stomates on its surface. The effects of fruits, when green, on the atmosphere, are the same as those of the leaves, but generally of a more limited extent. In the night they absorb oxygen like the leaves, and return most of it during the day.

This continues during their green state, and but little change occurs in the ripe stage, only more oxygen is returned to the atmosphere, thus making it probable that the acidity and harshness of green fruit is owing to the oxygen it contains in its composition.

158. The constitution of the fruit differs materially in its ripe, from what it was in the green state. Water and lignine diminish, and sugar increases. Water diminishes from two to ten per cent in different kinds. Lignine generally in a greater proportion. Sugar increases in currants from 0 52 to 6.25, it being twelve times the quantity in a ripe from what they possessed in a green state. This, the remarkable changes in taste would lead us to suppose without analysis. The manner in which this change takes place, is as yet undetermined. In many cases we know that sugar is produced at the expense of starch, but no starch can be discovered in those fruits which generate the greatest amount of sugar, such as Currants, Apples, Peaches, &c. That it takes place at the expense of the other proximate principles aided by water, is certain, since it goes on without any increase of weight, and even when separated from the parent stock, and also in the process of cooking. It is a well known fact in chemistry, that the action of various vegetable substances on each other, aided by moderate heat, will produce the saccharine principle. The vegetable acids with gum and mucilage will produce this effect, and so will sulphuric acid by its action on lignine or starch. These principles are contained in all succulent fruits, tartaric acid, malic acid, gum and various other substances peculiar to each fruit. The act of ripening, therefore, is a chemical process, which consists in converting the various unpleasant and injurious principles of the green fruit, into one of the most nourishing and healthy of vegetable products.

159. Although the above conveys the general principles on which, we believe, the ripening of fruit proceeds, yet in some cases, these substances, from which we suppose the sugar to be formed, increase at the same time; yet we believe that in all cases, either the acid or the other principles diminish, and never both increase or remain stationary in the same

fruit. If the acid increases, the other principles diminish. If the other principles increase the acid diminishes.

For these processes to go on, an atmosphere containing oxygen is necessary; showing that this active agent is required in these operations, and performs some necessary office in the conversion of the crude material of green fruit into the palatable ones of the ripe.

Section 5. *Germination.*

160. By germination we understand the commencement of the vital action which produces a development of the embryo of the seed. The necessary conditions of germination are the presence of water, heat and oxygen gas. The last is usually supplied by the air.

161. Germination cannot take place in the absence of any one of these agents, and in the absence of water, no effect is produced towards germination by the exposure to both of the other agents. With it they act promptly. The water enters the seed by the hilum, and passes to the perisperm by the chalaza, from the perisperm to the embryo through its point of attachment. This is the direct course of the fluid through appropriate vessels; but in some cases, as in the Beans and Peas, it will penetrate the testa and enter the embryo directly through its substance, when the vessels of the hilum are obstructed, by being covered with wax or other substances impermeable to water, but germination goes on much more tardy. In others the obstruction of the vessels proceeding from the hilum, prevent germination entirely as in Wheat, Oats, &c. This difference may very readily be imagined to arise from the fact, that the wheat is not only covered by a testa, but also with the pericarp, which is fitted to resist the action of external agents, as other pericarps are; while the bean is covered only by the testa, its pericarp having discharged its contents at maturity. The wheat being deprived of its pericarp, germinates promptly when its hilum is obstructed and the seed immersed in water, as the testa is but a thin mucilaginous tissue.

162. Seeds will not germinate in a vacuum, nor in any gas except oxygen; nor in distilled or recently boiled water, but by the presence of 0.3 of oxygen in any of these cases, germination will commence. The action of the oxygen seems to be in combining with the carbon of the seed, and forming carbonic acid; producing as Raspail says, fermentation; a part of the acid is thrown off, and a part no doubt elaborated by the increasing embryo. It has been recently proved by

Edwards and Collin, that the oxygen which the plant uses, does not all come from the air, but that the embryo possesses the power of decomposing water, and using the oxygen and hydrogen for different operations in developing the plant.—It would seem, however, that a small quantity of oxygen was necessary to produce a commencement of the vital action, to give the first impulse to vitality. By numerous experiments, it has been proved, that the best proportion of oxygen with other gases is as one to four, the very ratio found in nature in the constitution of the atmosphere.

163. Heat is another necessary condition, on which germination depends. Germination cannot take place in a temperature, unless some degrees above freezing, and it may take place in a temperature, which would be entirely inadequate to the perfection of its growth. If the temperature is too high, the seeds may germinate, but unhealthy action is produced, and the plant perishes by over action, produced by this powerful agent.

164. It has been found that Wheat, Barley and Rye, would germinate at 44 degrees Fahr. which is about the lowest point it would take place. These grains being composed in a great degree of starch, and at the expense of which germination probably proceeds, it was thought that these seeds would sustain any temperature as high as starch would, without bursting its integuments. Under ordinary circumstances this takes place at a little above 167°, but this temperature was found sufficient to destroy the vitality of the various grains, Beans, Peas, and like seeds. Many lost their vitality at 125° and some as low as 113°, temperatures which the surface of our soil often exceeds. These facts teach us the necessity of shading, or of planting our flowers and delicate garden seeds in cool places, when it is done after the warm days of our spring come on. We vainly endeavored for two or three years to obtain plants from various seeds, by the utmost care in preparation of the soil, and in planting, but the seeds would not germinate. We then sowed them in boxes in the shade, and they germinated readily, and by transplanting accomplished our desires Much of the vituperation against seed, men would be saved by a similar course. Many of our common garden seeds require similar treatment.

165. When the three agents above noticed, are brought to act upon the seed in due proportion, it begins to swell, bursts its integuments generally by the protrusion of a radicle; which takes its direction downwards, and soon after the plumula or stem makes its appearance and takes its course up-

wards. During germination, considerable heat is generated, no doubt the effect of the action of the oxygen on the carbon of the seed. This may be witnessed in the germination of large masses of Barley. The most important change produced in germination on the contents of the seed, is the conversion of the amylaceous portion into sugar, which is what is mostly produced by the action of the oxygen, which takes away a part of the carbon from the starch, and thereby converts it into sugar, the starch containing 43.55 per cent of carbon, and sugar but 28 per cent, the other elements being in nearly the same proportion in both. The abstraction of 15.55 per cent of carbon from starch, therefore, converts it into sugar, the appropriate nourishment of the embryo plant.

166. The conversion of starch into sugar, is through the action of a recently discovered substance, called *Diastase*. This substance is produced at the commencement of germination, and the sole object of its production seems to be the conversion of starch into sugar, for the use of the embryo plant. It does this with the greatest promptness; even when artificially obtained it will convert two thousand times of its own weight of starch into sugar. It is perfectly inert in relation to any other vegetable product. Its situation in the grain, would lead us to suppose that its operation was of the character above assigned to it. It does not exist in the radicle, or in the cotyledons of the seed, but immediately in the passage from the cotyledons to the germ. It also exists in tubers, as the potatoe, and in them it is not distributed throughout the substance, but only at the very origin of the eyes, precisely at the place where one would conceive it to be placed to dissolve the amylaceous substance for the nourishment of the growing organs. This is an exceedingly important discovery in relation to vegetation, as it carries us one step farther into the mysterious operations of nature, as exhibited in the nourishment and growth of vegetables.

167. The time required for germination is very different, in different species of plants, and even of the same species. Much influence also is exercised over this operation by soil, climate, localities as to moisture and exposure.

Under favorable circumstances, Wheat, Oats, Rye and Millet, will germinate in *one* day. Spinage, Bean, Turnip, Radish, Mustard in *three* days—Lettuce in *four* days—Mellon, Cucumber &c. in *five* days. Horse radish in *six*—Barley in *seven*—Purselane in *nine*—Cabbage and Hyssop, in *ten*—Parsely, in *fourteen or fifteen*—Almond, Peach, Pæony a *year*—Rose, Hawthorn *two years*. These results will vary

from the age of the seed before exposure to the agents that produce germination, and the influences to which it has been exposed, whether its vitality may have been injured by moisture, heat or light, all of which exercise a deleterious influence on seeds.

168. The time through which seeds will retain their vitality, is very different in different species, when exposed to the same influence. We believe, however, more depends on the action of elements of the atmosphere and light, than upon the necessarily limited time of suspension of vitality in the seed itself. We have known seeds, which are generally considered as losing their vitality at the end of one year, readily germinate after being kept for several years in a dry atmosphere, and of nearly uniform temperature, and protected from the light. Seeds which are generally considered as retaining their vitality only one year, have been known to germinate at the end of *one hundred years*, and cases are often recorded of seeds germinating after lying buried in the earth beyond the reach of the atmosphere, for at least *seventeen hundred years*. Any table on this subject, therefore, is necessarily a very imperfect guide, unless it should be based on some specified manner of keeping the seeds. The best course to follow in the *preservation* of seeds, is to keep them as much as possible in a temperate and dry atmosphere, protected from the action of the light. In the purchase of seeds, kept in the usual manner, fresh ones should always be required.

Section 6. *Food of Plants.*

169. The principal food of plants is water and carbonic acid, which are received through the roots in a liquid state, and through the leaves in a gaseous form. Besides these nitrogen and various salts enter in a greater or less degree into the composition of vegetables.

Carbonic acid seems to be the most essential article of nourishment for vegetables; since they will not thrive in a soil or medium in which this gas is not found or generated, and just in proportion as this gas is furnished to the roots, in the same proportion does the plant become vigorous and thriving; hence articles, which produce or undergo fermentation, are the most powerful manures, hence yeast is said to be the most efficient manure that can be applied. This results from its power of creating fermentation in the organic substances found in the soil, and thereby yielding carbonic acid. Carbon in its uncombined state, seems unfitted for nourishing the

plant. Sir H. Davy, placed a plant in water, containing carbon in an impalpable powder, and not a particle entered the roots. Lindley says, "the carbonic acid enters the root, being decomposed to a certain extent as it passes along, and giving apparently its oxygen to the spiral vessels, which convey it into the other parts of the system; when it reaches the leaves, it liberates its oxygen completely, and leaves its carbon to unite with the tissue of vegetation, or to enter into new combinations with water, atmospheric air, or other elements it finds itself in contact with; whence proceed the gummy, amylaceous, resinous, oily, and other products, peculiar to the vegetable kingdom.

170. Water also is a necessary and important substance in the economy of vegetables. Some have considered it almost the only article of nourishment of the plant; while others have assigned it no other importance than that of forming a medium, by which the appropriate food is enabled to pass into the plant. Both we believe are wrong. It does form a medium for the passage of other food, and that a part, that enters the plant, becomes food also, has been abundantly proved, but not to the extent perhaps, that some would seem to suppose. Theodore de Sausure remarks, that if we calculate with the utmost care all the weight which a plant can gain by fixing carbon, by depositing earthly, saline, alkaline, and metallic matters, which it borrows from the soil, by respiring oxygen, or from the soluble matter of the soil, we shall not be able to account for more than one twentieth part of the real weight of such a plant. The other nineteen twentieths must therefore be fixed water. This may be an over estimate, and probably is, but that water is decomposed and solidified, is placed beyond a doubt when the composition of vegetable products is considered; for from no other source could the plant obtain the elements of its various products, but from the decomposition of this fluid. The large amount of Hydrogen, found in the various volatile and essential oils, must come from the decomposition of water. But besides the water which is decomposed in vegetable digestion, much of it is, no doubt, solidified without decomposition. The elements, Oxygen and Hydrogen, of Sugar, Starch, Gum &c., are in that exact proportion in which these elements unite to form water. The atomic composition of these substances seems to indicate the simple union of carbon directly with water, and the conversion of one into the other, by the simple loss of carbon confirms this supposition, and we are unable to see the force of the arguments, which have been offered to support a contrary opinion.

171. Nitrogen has generally been considered as performing an unimportant part in vegetation, entering into the composition of some vegetables, but not into all. Boussingault in a memoir published in the tenth volume of the "Annales des sciences naturelles" proves that nitrogen is a constant and necessary element of perfect vegetation. That in cases where vegetables were made to grow by excluding it from the roots only, the seeds were not perfected. In an experiment on 1586 grains of Trefoil seeds containing when the experiment commenced .114 of a grain of nitrogen, the agency of nitrogen is abundantly established. These were made to germinate and grow in silicious sand, previously heated to redness, to destroy all organic substances, and watered with distilled water, and at the end of three months the nitrogen had increased to 156 of a grain, thus gaining from the atmosphere .042 of a grain of nitrogen; thus proving beyond a doubt that nitrogen is taken into the plant as a part of its food. These experiments were performed with the utmost precaution, that nothing but pure atmospheric air should have access to the plants. Different experiments were continued during different times, and the accession of nitrogen was in proportion to the length of the time the expriment continued, under similar circumstances.

172. From various considerations, Boussingault comes to the conclusion that nitrogen forms an important part in vegetation. It is admitted, he says that the force of vegetation is in proportion to the nourishing saps, which are met with in the earth, understanding by nourishing saps, those parts of manure capable of being absorbed by the spongiole of the root; *that*, in a word, which constitutes the fertility of the soil. Thaer has shown, that those manures procure for lands the greatest fertility, which contain the greatest proportion of animal matter, and he (B.) has shown, that those are most nutritive, which contain the greatest quantity of nitrogen, and that those plants empoverish the soil most, which contain the most nitrogen. Hence concluding that the exhaustion of the soil is occasioned by the abstraction of azotic matter, which makes a part of the nourishing saps, and that, to restore to the soil the degree of fertility, which it possessed before cultivation, it is necessary to introduce by manure an equivalent quantity of this same azotic matter. Some crops, he says, (and it is well known) increase the fertility of soils, such as grasses, which are cut while green, since the greatest amount of nitrogen is required in perfecting the seed, and in this case this exhaustion is saved; now, the roots remaining

in the soil, together with what is derived from the atmosphere, more than compensates for the stalk, which is taken away; that is, the soil has received more vegetable food from the atmosphere and the roots, than it has yielded to man. But Boussingault takes a more extensive view of the subject. He supposes a farm devoted to the cultivation of grain, possessing of course, a sufficient amount of stock; one knows by experience what quantity of manure is indispensable, therefore the relation which ought to exist between the surface cultivated in forage, and that devoted to the cultivation of merchantable produce. Each year they will export grain, cheese, and some animals. Thus there will be a constant export of azotic products, without any importation of similar matter, and during all this time the fertility of the soil is not impaired. The organic material constantly exported, will be replaced by the culture of ameliorating plants or by fallowing; and the art of agriculture consists in adopting the rotation which best favors the most prompt transition of the elements of the atmosphere into the soil.

173. The above is a true representation of the course pursued on numerous farms, where there is a constant exportation of products, but no importation of manure, and yet the farms are increasing in richness; but we are sorry to remark that the soil of many other farms within our acquaintance which export no more, by carelessness and mismanagement, is becoming exhausted. The latter class of farmers are inflicting serious injury on posterity, as it will require a long series of years to bring back an exhausted plantation to a state of fertility, although it requires but little proper management to keep a good plantation good for ages.

174. But besides the above named elements, various other substances enter into the composition of vegetable food, which act in hardening the tissue, and some of them probably as stimulants to the vegetable functions. Some plants require the presence of silex in order to form their appropriate tissues, as the cane, corn and grains generally. The various salts of lime enter into the composition of vegetables, as the phosphate in the *Phytolacca*, the oxalate in the Iris and Rhubarb. Potash enters into the composition of all plants not exposed to the action of salt water, and those that are thus exposed, contain soda. From the ashes of the former, the potash, and from those of the latter the soda, of commerce, are obtained.

175. From this constitution of vegetables, different plants require different soils for their production in the highest de-

gree of perfection. Some require silicious soils, others a soil containing lime, and others argillaceous or clay soil; for each plant will be but imperfectly developed in a soil, when it does not find the necessary materials for its organization. Raspail remarks, that "for the reason that a plant would die in a vacuum, for the same reason, would it die in a soil destitute of the bases which were necessary for its organic constitution. This would be asphyxia for want of soil, as the other is asphyxia for want of air; for to live is to combine, and without elements no combination would be possible." But in most soils all the necessary elements are found in a greater or less degree. To these facts, the eye of the agriculturist should be open, and the constitution of his soil should be known, that he may be enabled, as much as is in his power, to supply the deficient element, necessary for the crop he wishes to produce. It is a common complaint in almost every section of country, that some plants uniformly degenerate. In some places it will be one kind, in others another. Now Raspail has shown, that although a soil might be rich in every other respect, but not containing the necessary salt for the particular species, the plant uniformly degenerates, and finally ceases to produce seed. The gardener, being aware of this fact, should make such application as the general nature of his soil seems to indicate.

176. We should be glad in this place, to extend our observations on manures, drawn from the writings of De Candolle, Raspail, Dutrotchet, Davy, Boussingault, Thaer, and various authors of our own country, but our space forbids it. The subject would afford matter for a treatise by itself.

Section 7. *Circulation of the Sap.*

177. Within the last few years much has been accomplished in this department of vegetable physiology. The circulation in the cellular tissue, we noticed under the description of that tissue, and it will be unnecessary to notice it farther in this place. That is called the circulation of *Rotation*. There are two well distinguished kinds of circulation, *General* and *Special*. The one above noticed, is of the latter kind.

178. That there is a general circulation from the roots to the leaves, is plainly indicated by the rapid evaporation which is constantly going on from the surface of those organs. How soon does a vigorous plant wither and diminish sensibly in weight, when cut in the mid day sun? And plainly for no other reason, than that the source of its supply of fluid is cut

off. Hales many years ago, made some interesting experiments, not only proving this general circulation, but determining the force, with which the fluid moved forward.

179. By the aid of a glass tube, containing mercury, attached to the stalk of a vine cut off two feet and nine inches from the ground, the force of the sap at its maximum raised the mercury 32½ inches, which was on the twelfth day after the experiment commenced, April 18, at 7 A. M., which force was sufficient to raise water 36 feet.

"In another like mercurial guage, fixed near the bottom of a vine which ran 20 feet high, the mercury was raised by the force of the sap, 38 inches, equal to 43 feet 3 inches hight of water, which force is more than five times greater than the force of the blood, in the great crural artery of the horse, seven times greater than the force of the blood in the like artery of the dog; and eight times greater than the blood's force in the same artery of a fallow doe."

180. These experiments show not only circulation, but that it is carried on with great force. The force with which the sap moves in vegetables varies with the seasons and the hours of the day. It is most powerful in the spring, and in the morning of the day, and under the direct action of the sun after a rain. The course which the sap takes in its general circulation, is from the roots through the alburnum to the leaves, and downwards through the bark, and laterally by the medullary processes. These facts may be shown by cutting in early spring into the sugar maple, and we shall find the sap running from the alburnum only, and mostly from the lower surface of the wound, showing the upward course of the sap is through this part of the stem. If the same tree be cut in mid summer, there will be little or no issue from the alburnum, but the bark will now give out a fluid from the upper edge of the wound, proving that the downward current is through the bark. The reason that has been assigned for little or no sap issuing from the cut alburnum in summer, is that the draft made upon it by the evaporation, prevents the vessels from holding enough sap to issue from the cut ends.

181. That the sap, before elaboration, ascends within the wood, and that most of it after this process, descends within the bark, is proved by tying a ligature very tight round a branch in spring, and the branch will greatly increase above the ligature, and but very little below it; thus showing that the sap was not obstructed in its ascent, but was obstructed in its descent. This operation will very much increase the size of fruit on any branch, for a single year, but it injures

the tree for succeeding years ; since the proper amount of alburnum is not deposited in the trunk, and from the hardening of the previous alburnum, the sap for the succeeding year is obstructed in its course.

182. The cause of the ascent of the sap has been attributed to the evaporation of the leaves, to capillary attraction, aided by the motion of the stem produced by the wind, to endosmose, and to vital action. We believe it is generally not due to any one of these, but to all of them, and we believe more is due to vital action than to any other cause. That it was wholly owing to vital action, in the first experiment quoted from Hales, is evident from the facts, that none of the other alledged causes could act. Evaporation from the leaves could not have produced it, for he states that there were no branches on the stem subjected to experiment. Evaporation or Endosmose cannot produce a force exterior to the body in which they act. To vital action alone, then, we must ascribe the principal force with which the sap is propelled. It seems remarkable to us, that so much pains should be taken to explain phenomena on mechanical principles, which are wholly impotent, when applied to the circumstances under consideration. We are gravely told, and I quote high authority, that, " when a young bud is first excited to growth in the spring, the fluids it contains are increased in density by evaporation ; endosmose immediately takes place between it and the tissue below it, which latter parts with the thinnest portion of its contents, and then acts by endosmose upon the tissue below, and thus the whole cord of vegetation is set in vibration. It may be supposed that the mere effect of gravitation will carry downwards the sap, in its densest state, after it has ceased to obey the attraction of the leaves, and that it will descend by simple filtration till it reaches the roots ; but how we are to account for its lateral transmission, through the medullary rays, is still unknown".

183. The first phenomenon quoted, is that by evaporation, the fluids in the leaves are made more dense, which puts in action endosmose. Now we are acquainted with no experiment on the action of endosmose, where it ever separates the fluids under its influence. We have no particular objection to resorting to this new agent in putting the sap in motion, but we should like to know how this dense fluid, in the cell into which the lighter fluid is entering by this power, is to be discharged from the cell ? We have been unable, either from our own experiments, or those recorded by others, to devise any method. Endosmose, or Exosmose will not do it, for if

we resort to exosmose it can only pass out into the ascending current, and by becoming lighter by dilution, is drawn by Endosmose immediately back again. But our author solves the difficulty, by saying that gravity will carry the denser sap downwards! True, but how comes the denser sap separated from the lighter? and why does it not return in the same vessels in which it ascends?

184. How does gravity operate in carrying the denser fluid upwards, as in many cases in which the extremities of branches are lower than the point of insertion? We know of no solution to these questions, and we are compelled to say that they are facts of which we can only refer to the action of that mysterious principle which we call life. The action of this principle, is of course, modified by circumstances. It requires the action of external agents to call it into operation, and its force is increased or retarded by the same. Heat and moisture exercise great influence over it in circulation. In the cold of winter it is nearly suspended, but the warmth of spring calls it into action. After its action has commenced with some vigor, a cold night seems to retard or suspend its operations for the succeeding day. This is seen in the Sugar-Maple. The sap commences to flow from the incisions, when the warm days and cold nights of spring come on. But if several successive nights, are so warm that it does not freeze, the sap ceases to flow, and for the same reason that it does not flow in the summer, viz:, vital action commences in the buds, and the sap is directed to them; but when it freezes again at night, the sap will flow the next day, as the vitality of the buds is checked or suspended in its action by the cold.

Section 8. *Cyclosis.*

185. In the cinenchyma, there has recently been discovered a circulation distinct from the two we have noticed, and called cyclosis, the term we presume derived from Kuklos a circle. The only intelligible account we have seen of this circulation is from Prof. Lindley. The cinenchyma, as we have before described it, has its arrangements in no regular order, but lies imbedded in the other tissues, running in every direction. In this tissue the cyclosis takes place; the circulating fluid being generally, though not always a milky substance, and is called *later*. The latex which conveys granular matter, circulates through a plexus of reticulated vessels in all directions; when the vessels are parallel, and near each other, the currents rise in some, and fall in others, but, in connecting or lateral vessels, the

currents are directed from right to left, or the reverse, according to no apparent rule. The contiguous rows of vessels anastomose from place to place, which produces a permanent interruption of the rising and falling currents. In order to enable the circulating motion to take place, it is necessary that the system of vessels should be reticulated. It often happens, that when strong currents are formed, weak ones disappear. In cases when the cyclosis cannot be actually seen in the vessels, it may be inferred from the following fact. When the two ends of a stem containing milk are cut through, the latex is seen to run out at both ends of the fragment, which proves that there must be both an ascending and descending current; the same phenomenon is visible in plants, having a colorless latex, therefore there must be a motion of ascent and descent in them also.

186. "Cyclosis occurs in the greater part of monocotyledonous, and dicotyledonous plants, and the vessels in which it takes place, are so generally in connexion with spiral vessels, that the presence or absence of the one is usually accompanied by that of the other. The situation of the vessels in which it is found is in the root, stem, petiole, peduncle, flower, &c."

187. The latex is a highly elaborated, and highly organized juice. It is usually viscid, insoluble in water, often opaque, colored white, yellow, brown, red, and is also transparent and colorless, differences that result from the nature of the organized globules it contains, which, according to Mr. Schultz, constitute the *living part of the latex*. These globules have an oscillating motion, and like the globules of the blood, they coagulate and the liquid part becomes transparent. Upon exposure to the air, the latex separates into a *coagulum* of a tenaceous elastic quality and a serum; the former being somewhat analogous to caoutchouc. This property is not found in any other vegetable secretion. If we consider the organization of the latex, the globules it contains, its property of coagulation, and separating into serum and a sort of fibrin, we are tempted to believe that there exist a considerable analogy between it and the blood of animals.

188. The latex itself originates in the sap, which rises by the tissue of the wood, and introduces itself into the foliaceous organs, thence after being elaborated, passing into the bark where it is deposited in the vessels in its mature form. The function of the latex is to nourish the tissue among which it is found. The loss of only a small quantity of latex, injures a plant very much. It is the phenomenon of *autosyncrisis and autodiacrysis*, (attraction and repulson of the globules) which

produces assimilation and nutrition. In consequence of the latter force, the molecules of the latex, escape through the sides of the vessels, to be conveyed to the parts requiring nutriment; while on the contrary autosyncrisis, brings about the assimilation of the nutritious matter.

189. "Cyclosis is analagous to the motion of the blood in lower animals, or in the fœtus of a fowl before the heart is formed, when as Malpighi and Wolfe have shown, the blood moves spontaneously in the vascular apparatus."

190. We have thus extracted from Prof. Lindley's late work, the most important points on the subject of cyclosis, and we confess that at present we are unable to decide as to several positions assumed on this subject.

191. The power which plants possess of *accumulating* sap, and drawing on this store, as food for future use, is a subject of much interest, and of much practical importance. Striking examples of this kind, we see exhibited in the Radish, Turnip, Beet, &c. In these cases the energies of the plant are spent in the first period of their existence, in laying in stores of food in the form of large succulent roots, which is to be used when the plant requires large supplies of nourishment in the perfection of its seed. But plants which do not so obviously provide this accumulation of food, nevertheless, require a fit state of development before they can perfect their fruit. The gardener is well acquainted with this fact, since he knows that Melons and like fruits, which set early, either uniformly fall off, or are diminutive and useless, but if they are not permitted to set till the vine is well developed, and filled with sap, they then grow rapidly and come to perfection, having a full supply of food laid in store for their use. It is a well known fact, also, that when a fruit tree is prevented from bearing one year, that the fruit for the next year is much better than the ordinary fruit of the tree; the tree having accumulated food during the year of rest, which contributes to the abundance and perfection of the fruit. Trees also, sometimes cease to bear only every other year, either from age, or from want of sufficient nourishment in the soil, in which they grow; they cannot bear the exhaustion attendant on the perfection of a yearly crop of fruit.

192. The fleshy receptacles also of many plants, afford nourishment during the perfection of the seed. In some of the grasses, when they grow in moist soils, they become tuberous, laying up food in the tubers, for times of drought.

Section. 9. *Irritability.*

193. The vitality of plants is often exhibited by various spontaneous motions; by the sensible effects produced by the actions of external agents, all of which phenomena are attributed to *irritability.*

Of the former of these phenomena, the most common is what is generally called the sleep of plants. In plants with compound leaves, the leaflets often close on the approach of darkness, and expand again on the return of day. Many flowers also undergo the same changes. Some flowers, however, are unable to sustain the light for the whole day, and close their flowers under the direct rays of the sun. In some cases also, the calyx and floral leaves embrace the flower, seemingly for the purpose of protecting it from the action of the cold and moisture of the night. Most of the preceding phenomena are, no doubt, due to the action of the light, since they may be made to take place by artificial arrangements, for the production of light and darkness.—Lamp light will make some plants unfold their petals, which have been closed for the night.

194. In some cases there are constant movements of leaves or petals. We have upon record, remarkable examples of this kind. In the *Megaclinium falcatum*, the labellum is in constant motion. In the Pterostylis, there is a kind of convulsive action of the labellum. The filaments of the Oscillatorias are continually writhing like worms in pain. The Hedysarum gyrans is the most remarkable instance of this character. This plant has ternate leaves, the terminal leaflet, which is larger than those at the side, does not move except to sleep; but the lateral, especially in warm weather, are in continual motion, both day and night, even when the terminal leaflet is asleep. External stimuli produce no effect. The motions are very irregular, the leaflets rise or fall, more or less quickly, and retain their position for uncertain periods. Cold water poured upon it stops the motion, but it is immediately renewed by warm vapor.

195. Movements produced by the action of external agents are various. The common sensitive plant, offers a familiar example; by touching one of the leaflets, the whole closes, and the petiole bends downwards to the stem. The touching the base of the stamens of the Cassia, causes it to fly up against the pistil. The Dionea Muscipula, is a case very much in point, but not very common. The lamina of the leaf is surrounded by long stiff bristles, and if the upper surface of the

leaf is touched, the sides collapse, the bristles passing each other like the teeth of a steel trap, thus effectually holding any insect that may light upon its surface, and the more the insect struggles for liberty, the more closely the leaf contracts.

196. The effect of poison on plants is exhibited, by movements indicating their action.

A solution of the oxyde of Arsenic, killed Beans, Roses, Lilacs, &c., after an action of a few hours in the former case, and in some days in the latter cases. Corosive Sublimate, and various other mineral poisons produced similar effects, but salts that are harmless to animals are so to vegetables. Vegetable poisons, such as Alcohol, Prussic acid, Belladonna, Laurelwater, and the like destroy the life of vegetables, as they do that of animals.

197. From numerous experiments of the most distinguished physiologists, it is thought that the action of poisons operates on vegetables, through a system similar in its organization to that of animals. Any one, seeing the effect of vegetable poisons, on various plants, throwing them into apparent convulsions, and producing immediate death, without any disorganization of the tissue, must confess that there is an endowment of plants, which the physiologist has as yet been unable satisfactorily to attach to any appropriate apparatus.

Section 10. *Color.*

198. The products of no department of nature have been more admired for the beauty of their colorings, and the variety of their tints, than those of vegetables. Flowers have ever been the noted examples of nature's penciling, and from their beauty in this respect they have been the subjects of the poets strains.

> "Who can paint
> Like nature? Can imagination boast
> Amid her gay creation, hues like hers?
> Or can she mix them with that matchless skill,
> And lose them in each other, as appears
> In every bud that blows?"

Our Savior with unequalled beauty, in his allusion to the Lilies of the field, yields his assent to the same sentiment.

199. The various colors are supposed to have their origin in a substance, called *Chromule*, and that the great variety of hues presented in the vegetable kingdom, are produced by the action of acids and alkalis on the chromule.

Chromule in its natural state is green, and by maceration may be readily separated from the tissue, to which it gives coloring. The grains of chromule are of an irregular

shape, rather approaching the sphere, but somewhat angular, and consist of a semi fluid, gelatinous mass, not enclosed in a sac. It is affirmed by some to contain iron and manganese, to which the varieties of color are owing, produced by the accession of these different substances, as it is well known that almost every hue may be produced by these two metals. But the quantity of chromule which exists in plants is exceedingly small; Berzelius estimated the quantity in the leaves of a large tree not to exceed three and a half ounces.

200. To enable plants to deposite chromule, light in most cases, is absolutely necessary. This is abundantly shown by the fact, that plants growing in the dark become blanched; not that the chromule already deposited becomes less, but that it is surrounded by the deposition of substances containing no chromule, and of course becomes less observable. There are examples however, of plants, growing in deep mines, having never enjoyed the light of day, which, nevertheless are green.

201. Green is considered the natural color of vegetation, and when it is not of this hue in the language of Botany, it is said to be colored.

202. The change of color produced on chromule, has been referred to different causes. The two most deserving of notice, are the one of Schubler, and Funck of Tubingen, and the other of Macquart.

Both theories consider green as the original color, but the means by which the variations are produced, are accounted for on very different principles by the supporters of the two theories. Schubler and Funck maintain that all variations from green are produced by acid, or alkaline secretions. The green chromule acted on by these substances assumes every variety of hue. The hues assumed by the flowers, are determined by the different agents by which they are produced, with the exception of red; this is common to both. Those produced by the action of the alkaline secretions, from green, are

Greenish blue,	Violet-blue,	Violet-red,
Blue,	Violet,	Red.

This is called the *Blue*, *Cyanic* or *Disoxydized* series, and any variation of color from one of these hues, will always be by passing into some other of the same series.

Those colors produced by the acid secretions are

Yellow-green,	Orange-yellow,	Orange-red,
Yellow,	Orange,	Red.

These constitute what is called the *yellow*, *xanthic* or *oxydized* series.

This theory has been attacked by the most able physiologists, and they have considered themselves successful in pointing out errors in experiments and observations which are sufficient to invalidate this extensively received theory. Mohls, in a memoir in the *Annales des Sciences Naturelles*, Vol. ix. p. 212, examines various theories on this subject, with apparent impartiality, and gives his decided preference to the following theory of Macquart, although it does not receive his unqualified approbation.

203. Macquart admits that the various colors are owing to the various modifications of Chlorophyll, but denies that it is owing to its being oxydized by acids, or disoxydized by alkalis. But that it is converted into two distinct substances, by the addition and abstraction of water. By the loss of water it is converted into a blue substance, called *anthocyane*, which is soluble in water, but not in alcohol. By the addition of water, the chlorophyll is converted into a yellow substance, called *anthoxanthine*, which is partly soluble in alcohol, and partly in water. These two substances form the basis of the two series of colors above given. They both sometimes exist in the same flower, but occupy different cells; the anthoxanthine being situated in the inferior cells, while the anthocyane occupies the superficial ones; this gives a great variety of tints, according as the color of the inferior cells are more or less distinctly exhibited through the superior layers. By the action of acid and alkaline secretions, these substances assume every variety of hue ascribed to the action of the same agents on chromule.

204. The outward circumstances, which tend to change the color of vegetable organs, are various. The action of light is one of the most efficient agents in the production and change of colors; and it is not a little singular, that the power, which is absolutely necessary to the production of color, in the great majority of cases, should be the most powerful agent in destroying it. We are all acquainted with the influence of light in blanching vegetable substances when dead. The change of the color of leaves in autumn, of fruit when ripening, of some ever green leaves during the winter, are phenomena whose explanation, has as yet baffled the most acute observers. The memoir of Mohl, above quoted, leads us one step farther than had before been taken in the explanation of these common phenomena.

205. We can only give in few words, the results to which his extended observations have led him. He concludes that these various changes are owing to a derangement or suspen-

sion of functions, of the organs of nutrition. This point he strengthens by the consideration, that the puncture of an insect will cause an organ to pass through all the steps to maturity, giving all the hues belonging to its species, whether of fruit or leaves. Also, the cold of autumn and winter, produces a similar derangement; although the agent is different, yet the result is the same. Many ever green leaves become tinged with red in winter, from the influence of cold, but with the return of summer, assume their accustomed greenness; also, the leaves of the extremities of the branches being most exposed to atmospheric influences are changed to red, while those nearer the trunk continue green. If one half of a leaf be protected from the cold, it will remain green while the other half will change to red. But in the case of fruit, heat is the agent, in producing similar effects to those above ascribed to mechanical injury and cold.

Section .11 *Odors.*

206. Much of the importance attached to flowers by people, generally, is owing to the odors they exhale. The rose has long been cultivated by amateurs, no less for its grateful fragrance, than for its beauties of form and color; and those, which combine these properties, are the most favored objects of the Florist's care. The cause of the odors of Plants, is no doubt, the disengagement of a volatile oil, which, in some cases is easily obtained, and made subservient to the use of man, in others it entirely eludes every effort, to confine or preserve it, being as evanescent as the light, which is the agent of its production.

207. Odors are distinguished into *permanent, fugitive,* and *intermittent. Permanent odors* are such, as are enclosed in the tissues of the wood and bark of plants, in a concentrated form; and either from being but slightly volatile, or contained in close vesicles, which prevent exhalation, they remain for a long time, giving to the organs in which they are contained their peculiar odor. There is probably no part of a vegetable absolutely destitute of permanent odor. Every variety of wood, under certain circumstances, exhibits it. Some, nearly scentless otherwise, become strongly odorous, when rubbed or heated. The Pine, Oak and Beech, are examples of this kind. Others are odorous for a long time after being cut, under ordinary circumstances; of this kind, are the Rosewood of Teneriffe, the Cedar and Sandal wood (Santalum Album) of India, so highly esteemed in Eastern Asia for its fragrance.

The slight volatility of the oil, to which these species owe their odors, and the compactness of the wood, enable them constantly to yield their fragrance for an indefinite length of time.

208. Others are fragrant when first cut, but lose this property in a very short time, as is the case with the Cinnamon and Cassia, the fragrant substances being volatile, and the wood porous, both causes concurring to render the wood in a short time scentless.

209 *Fugitive* odors are such as belong to organs of short duration, as the leaves and flowers, and we meet with them in the greatest abundance, and most frequently in the latter. All are aware, that the flower is the source whence flows the delightful fragrance of the flower garden; and during the season of bloom of our Magnolias, the woods and swamps are perfumed by the odor of their flowers. It must have been remarked also, by the most heedless observer, that the odor of the garden, or forest of Magnolias, is much more pungent at some parts of the day, than at others. During the direct action of the mid day sun, little or no perfume is perceptible from either; but as the sun sinks to the horizon, and the dews begin to settle on the leaves, the evening air becomes scented with their fragrance. The odor accumulates during the night, and as the dew begins to exhale with the rising sun, it is borne on the air in much greater abundance, than at any other hour. Thus these silent worshipers pour forth their incense in a morning sacrifice to Him, who extends to them, as to all, his kind regards.

A shower produces similar effects. Who has not enjoyed the grateful odor, exhaled from the flowers of the field or garden after a summer's shower?

210. The causes of these apparently great emissions of odor, under the circumstances mentioned, and the apparent suspension of their emission, have not been satisfactorily determined. It has been supposed, that the heat of mid day, under the direct action of the sun's rays, produces so much evaporation, as to empty, in a great measure, the cells, and that the stomates close, and prevent the emission of the odorous substance; again, it is thought that the excessive evaporation would carry off more of the odors than the plant could generate, and thus the supply becomes exhausted during these hours of heat, and it requires the coolness of evenings, when aqueous evaporation is nearly suspended, for the plant to regain its supply; but a more probable reason (were we disposed to attribute it to any one alone) we conceive to be, that the exces-

sive heat of mid day producing upward currents of vapor, the odorous emissions are carried with them beyond our notice, but as night comes on, the currents cease, and the fragrant exhalations accumulate near the earth. A shower plainly would produce the same effect, cooling the surface of the earth, and reversing in some degree, the atmospheric currents. In the production of odors, the direct light of the sun is necessary, hence, after long rains, flowers become comparatively scentless, and this circumstance adds weight to the reason given above, and shows that the emission, so far from depending on the absence of light, as would seem at first view, from the fact of their becoming more sensible at the approach of night, and ceasing as the light becomes more intense: a long continuance of even cloudy weather prevents the emission entirely, showing that the generation of the fragrant fluid, is dependent, as above observed, on the direct action of the sun's rays. And it is well known, that most of the secretions of Phenogamous vegetables require the same action, and the more volatile products especially. From the extreme volatility of the substances producing fugitive smells, and the necessity of the direct solar rays, for their secretion, we could not be led to suppose that any loss of the secretions could take place under the influence of the mid day sun, or that they could be detained in tissues, which were continually emitting watery exhalations.

211. *Intermittent odors* are such as are given off at particular times, and the plants which yield them, are entirely destitute of such odors at other times. Many Orchidaceæ are perfectly scentless, during the day, but during the night are fragrant. A remarkable example of this class of odors, is exhibited by the *cacalia septentrionalis*, which, when exposed to the direct rays of the sun, emits a strong aromatic odor, but by merely interposing a screen between it and the sun, its fragrance vanishes. The Cereus gives out flashes or puffs of perfume, as its intermittent odors are called. "Morren observed in one case of a cut flower, that it gave off puffs of odor every half hour, from 8 to 12 P. M., when it faded, and the smell became very slight. On another occasion, when the flower was left on the plant, it began to expand at 6 P. M., when the first fragrance was perceptible in the green house. A quarter of an hour afterwards, the first puff of odor took place, after a rapid motion of the calyx; in rather less than a second quarter of an hour, another powerful emanation of fragrance took place: by 35 minutes past 6, the flower was completely open; and at a quarter to 7, the odor of the calyx was the strongest, but

modified by the petals; after this time the emanations of odor took place at the same periods as before."

212. Many other cases might be cited of singular phenomena, properly coming under this head. The odors in these cases are certainly developed or emitted on different principles, in the different cases under this variety. The explanations are entirely beyond our reach. There seems to be a specific action of the organs for the production of the odors, as there can be no glands discovered by which the odorous fluid is secreted. That the odorous fluid is emitted as it is generated, which of course must be periodically, is rendered probable by the fact, that emission of carbonic acid took place in the same manner from the flower of the Cereus.

213. Odors have also been classed from their similarity of effect on the human system into *aromatic*, *stimulating*, *penetrating* and *sweet*, but the difficulty of fixing definite limits to the application of these terms, renders the classification of little use.

CHAPTER VI.

INFLUENCE OF EXTERNAL AGENTS ON VEGETATION.

The influences, to which we shall direct our attention as exercising a decided influence on vegetation, are *light*, *heat*, *water* and *earth*. Many of the influences exerted by these agents on plants, have already been incidentally noticed under the description of organs, and their functions, in the preceding chapters; but we deem it expedient to give a more connected view of the subject in a separate chapter.

The concurrent influence of all these agents is absolutely required for the perfection of vegetable products; and according as some of them exist in excess, or in diminished quantity, is the functional operation of the vegetable organs injured or destroyed.

Section 1. *Light.*

214. We have made several remarks on the effects of light. in the section of the function of the leaves, to which the student is referred, in connection with what is stated here.

The most obvious effect of light on vegetation, is the production of colors, and this it effects by decomposing car-

bonic acid, and depositing the carbonaceous matter. In most cases, certainly, light is absolutely necessary for the deposition of the green coloring matter, since most plants become perfectly colorless by growing in situations in which they are deprived of light. There are cases, however, in which plants deposit the green chromule, when excluded from the light. Green vegetables have been found in caves of the earth, from which the light of day was excluded, and we have seen the cotyledons of the Mustard, and the Impatiens balsamina green, when the seeds have germinated within the perfectly closed pericarp; and I have now before me a large onion in which several of the central layers are as green as the leaves, while the parts above and around them are perfectly white. That these are exceptions to a general rule, is manifest from innumerable examples to the contrary, constantly occurring within the observation of every one. If a board lies upon the grass for a short time, the grass becomes blanched; Plants growing in a dark cellar are colorless; the interior of the cabbage is white, while the other leaves are green, and if these are removed, those that are exposed soon become green. Plants which in their natural situation are white, by accidental exposure become green; the side of a potatoe from which the soil has been by chance removed, soon changes its color from white to green. It may then be laid down as a general principle, that light is the great agent in the production of vegetable colors.

215. Light, Raspail says, influences plants to produce vascular tissue, and to make them combine with earthy bases; while in darkness, they produce the cellular tissue, and combine with ammoniacal bases. That light exercises an important agency over the growth of vegetables, and their secretions, cannot be doubted. An equal amount of light and darkness seems to be the proportion in which the greatest amount of vegetable vigor is attained. This is seen exhibited in the equatorial regions, where the days are uniformly twelve hours long, and the nights of equal length, and there we find the most luxuriant vegetation.

216. If according to the hypothesis, light acts in producing the firmer and more compact parts of vegetables, and in its absence, the more *yielding* and succulent parts are generated, we should be led to suppose, that where these periods were equal, the perfection of vegetable products would be found; and if the light is in much greater proportion than that of equality, just in the same proportion should we expect to find the products of such regions, harder, smaller, and less symmetrical. This is the exact state of vegetable products in high

latitudes. Trees become harder, smaller, and less luxuriant the higher the latitude, for during the period of their growth, the sun is a great part of the time above the horizon. That this is owing to the action of light, is proved by the fact, that by transporting vegetables into high latitudes, from equatorial regions, and keeping them in an atmosphere, at the temperature of their natural situations, by means of the hot-house, they flourish during the summer, but during the short days, and long nights of winter, they droop, exhibiting their suffering from the due influence of the solar rays.

217. Raspail's theory above noticed, receives confirmation from the fact, that those vegetables which consist entirely of cellular substance, are produced only in the absence of the light of the sun, such as mushrooms; their growth ceasing at the coming of light. And it is a common notion among gardeners (whether true or not, I will not pretend to say,) that melons, cucumbers, and like pulpy fruits, increase much more at night than during the day. Although Fungi grow only in darkness, they will never produce spores capable of germination, without the action of the sun's light, and it is said, that in cases where the light of day never enters, there may be Fungi, but they never increase or perpetuate themselves by the production of spores, but only by spreading.

218. It is during the direct action of the sun's rays, and by their agency, that the most important vegetable products are generated. It is by their influence, that water and carbonic acid are decomposed, the oxygen being mostly liberated, and the elements combining in other proportions, for the formation of the various oils, resins, &c., including the most important and abundant of the vegetable products. What is generally termed the sleep of plants, that is, the folding up of compound leaves, and the closing of flowers, is no doubt in most instances, occasioned by the want of the stimulating action of the solar rays; for we see leaves and flowers, that were folded up during the night, expand with the first rays of the morning sun.

219. We have upon record, many instances of the singular phenomenon of flowers during twilight, emitting flashes of light. It is said the daughter of Linnæus first observed this emission, exhibited by the *Tropæolum Majus* or Garden Nasturtium. The flashes occur only during twilight, in the morning or evening; those of the evening being much the most brilliant. The plants, from whose flowers these flashes have been observed to issue most frequently, are the Marigold, *Calendula officinalis*, Orange Lily, *Lilium Bulbiferum*, Af-

rican Marigold, *Tagetes Patula*, and Sunflower, *Hilianthus Annuus*, but Mr. Trimmer, in an article in the 2d vol. of "Paxton's Magazine of Botany," p. 193, observes that he had observed it in many other flowers.

220. The cause is supposed to be electrical, as the flashes are more brilliant, when the atmosphere is most highly charged with electricity. In walking in my garden, says Mr. Trimmer, in which was a considerable quantity of Nasturtium in bloom, not at all thinking of the flashing of plants, I was struck with the very vivid flashes that proceeded from them; the scintillations were the most brilliant that I had ever observed, at the same time the sky was overcast with a thunder cloud; and he further remarks, that he always found them most brilliant under such circumstances.

Section 2. *Heat.*

221. Heat is the most obviously necessary, of any external agent, to the existence and growth of vegetables; without a considerable degree of it, no vegetation takes place. We observe amid the colds of winter, vegetable life is suspended, and as the warmth of spring comes on, vegetation commences, and as the heat increases, plants become more vigorous, in the same proportion.

222. The beautiful arrangement in the vegetable economy, for the adaptation of vegetables, to this season of repose, can but afford matter for the most agreeable contemplation. In equatorial regions, where heat is constant, a great proportion of the vegetables, are of a peculiar organization, not yielding their leaves, not covered with bark, and producing no coverings to the buds; while in higher latitudes we find our forest trees expressly adapted to a season of repose, or a kind of hybernation. The leaves at the approach of summer come forth in immense profusion, perform with energy their functions, during the heat of summer, and at the approach of autumn, disengage themselves, by their own depositions, from the parent stock. We find also our forest trees, covered with a thick bark, composed of materials possessing the least power for conducting caloric; and the buds, the rudiments for the perfection of which the succeeding year's energies are to be devoted, enclosed in scales, nicely fitted for the protection and preservation of their important contents. The equatorial regions are emphatically the regions of monocotyledons, destitute of bark, and always in verdure. The temperate regions, with the year distinctly marked by the four seasons, is as

emphatically the region of the dicotyledons, clothed with transient verdure, and covered by thick non conducting bark. Herbaceous annual plants, seem in their economy to have been constituted, in reference to their preservation, during a season in which they could not flourish. The annuals of temperate regions, produce seed, fitted to withstand the various influences of a period entirely unsuited to vegetable growth. They are composed of materials the least affected by atmospheric influences, being capable of resisting, uninjured, the utmost intensity of cold; and it is a remarkable fact, that the seeds of tropical annuals which are peculiar to that region, are much less able to resist the changes of temperature, and retain their vitality, generally, but for a very short time. In the former case, the very continuance of the species depends on their producing seeds, that will retain their vitality, through considerable periods, and at the same time, resist the influence of rigorous climates, while in the latter there is not the same necessity for the same provisions, and in many instances, at least, these provisions are not made, while they are uniformly provided in the other.

223. Plants, like animals, seem to possess the power in some degree, of preserving a uniform temperature; whether this is owing in part to the action of vital power, or entirely to physical causes is doubtful. The uniform temperature of the earth, from which they derive their food, the non conducting power of the covering, which in a great measure, excludes both the heat of summer and cold of winter, and the evaporation in hot weather, and its suspension in cold, are causes, perhaps sufficient to account for their uniform temperature. Cases, however, are mentioned, of plants growing in soil, in the vicinity of hot springs, receiving their food through a medium, but little less than boiling water, and at the same time their temperature was but little affected by these circumstances.

224. Although plants may preserve their temperature to a certain extent, yet it is well known, that excess of heat, or cold will destroy them. The temperature they will bear without injury, is very different in different species. While our forest trees will bear uninjured, the most intense cold of our winters, others will perish in an atmosphere of thirty two degrees, and annuals are destroyed by the first frost of autumn. The manner in which cold operates in the destruction of vegetables, has of late excited considerable interest. The long prevalent opinion has been, that the well known phenomenon, that water at the moment of its conversion into ice, expands,

was the cause of their destruction. The tissues being filled with sap, it was supposed that when this was frozen, the consequent expansion ruptured the tissues, and unfitted them for any longer performing their functions. This very plausible theory, it seems has been entirely set aside by some, but by others it is still considered a concurrent cause in the destruction of some vegetables at least.

The following is compiled from an article in the 39th vol. of Silliman's American Journal of Science, from the pen of Prof. Lindley.

225. "Mr. Gœppert, denies that the laceration of tissue, takes place in freezing, and asserts that cold operates in destroying the vitality of plants, which is followed by a change in the chemical constitution of their juices."

Prof. Morren has given the following conclusions as the result of his inquiries.

1. "That no organ whatever, is torn by the action of frost, except in very rare cases, when the vesicles of cellular tissue give way, but that the vesicles of plants are separated from each other without laceration. 2. That neither the chlorophyll, the nucleus of cells, elementary fibre, amylaceous matter, raphides, nor the various crystals contained in vegetable tissue, undergo any alteration, unless perhaps in the case of amylaceous substances, which, in some cases are converted into sugar, no doubt in consequence of the action of some acid, formed by the decomposition of the organic parts. 3. That the action of frost, operates separately upon each individual elementary organ, so that a frozen plant contains as many icicles, as there are cavities containing fluid; the dilatation thus produced not being sufficient to burst the sides of the cavities. 4. That such dilatation is principally owing to the separation of the air contained in the water. 5. That this disengagement of air from water, during the act of congelation, is the most injurious of all the phenomena attendant upon freezing; introducing gaseous matter into organs not intended to elaborate it, and bringing about the first stage in a decomposition, of the sap and the matter it precipitates; so that with a thaw, commences a new chemical action, destructive of vegetable life. 6. That the expansion of the cells and aquiferous organs, drives a great quantity of water into the air cells and air vessels, so that the apparatus intended to convey liquid only, contains water and air, while that which is naturally a vehicle for air, conveys water. Such an inversion of functions, must necessarily be destructive to vegetable life, even if death were not produced in frozen plants, by the decomposition of their

juices, the loss of their excitability, and the chemical disturbance of all their contents."

226. Prof. Lindley's conclusions on this subject, coincide in many respects with the conclusions of Prof. Morren, but in some important points they differ, Prof. Lindley remarks, that in the most succulent species of plants, he did not find the vesicles of the cellular tissue, separable from each other; and that in several instances he found them lacerated, as if by the distention of the fluid they had contained. He also gives as one of his conclusions: "A chemical decomposition of the tissue and its contents, especially the chlorophyll," which is at variance with the second conclusion of Prof. M. above.

227. The displacement of the fluids by freezing, is one of the most curious and interesting phenomena connected with this subject; and it would appear one of the most important. Prof. L. supposes, that the difference in the effect produced by freezing, when frozen plants are thawed suddenly, or by degrees, is owing to the gradual return of the fluids to their appropriate vessels, when gradually thawed, and that when heat is suddenly applied, the air is expanded, and increases the disturbance already produced by its expulsion from the air cavities. We are all well aware of the fact, that it makes a great difference in the effects of a frost on vegetables, whether they are suddenly or gradually thawed. The gardener often preserves plants, which would otherwise inevitably perish, though perhaps not completely frozen in such cases, by watering them sometime before sun rise on a frosty morning, with well or spring water; by the application of a temperature, but a few degrees above freezing, the plant thaws gradually, and permits the air "to retract by degrees from its new situation, without producing additional derangement of the tissue." But if permitted to remain till the rays of the sun come upon them, destruction is inevitable. Apples and Potatoes also, if immersed in well water while frozen, are injured less by the frost, than they would be if permitted to be thawed by a more elevated temperature.

228. The effect of frost in converting starch into sugar, is well exhibited in the potatoe. This tuber when frozen, is decidedly sweet, and the starch which it before possessed in great quantities, has in a great measure disappeared.

229. "Finally" says Prof. L. "it appears that frost exercises a specific action upon the latex, destroying the power of motion. If as Prof. Shultz supposes, this is the vital fluid of plants, such a fact alone would account for the fatal effects

of a low temperature. In all the cases I have observed, frost coagulates this fluid, collecting it into amorphous masses."

230. It has been observed, that the most succulent plants suffer most readily and most severely by frost. This is thought to be owing to the conducting power of the tissue, saturated with sap. Hence plants that remain uninjured in dry soils, are very liable to be destroyed by frosts, if raised in damp and shaded situations. It may be adopted by the cultivator as a fact, that whatever tends to render tissue moist, will increase its power of conducting heat, and consequently augment the susceptibility of plants to the influence of frost; and whatever tends to diminish their humidity, will also diminish their conducting power, and with it their susceptibility.

231. The disengagement of caloric during the flowering of plants, is a subject of considerable interest, and might, perhaps, with equal propriety, have been noticed under fertilization; but as the phenomenon is as yet of doubtful origin, we thought it proper to notice it here.

The rise of the thermometer when applied to the spadix of the Arums at the time of flowering, has long been known. Senebier found the temperature 7° higher than the surrounding atmosphere. Hubert in experiments on the Arum cordifolium, in the Isle of France, found the thermometer rise from 66°, the temperature of the surrounding atmosphere, to 111° when placed in the center of the spadix, and in others to 121°, thus indicating a difference in one case of 45°, and in others of 55°. The greatest difference was observed to be in the morning. The accurate experiments of Brongniart have rendered it more than probable, that in all cases of flowering, heat is liberated, although from the structure, or size of the flower, it may be impossible to detect it by instruments. It is well known that during the flowering of plants, oxygen is absorbed, and in some cases this absorption has amounted to thirty times the volume of the subject of experiment in twenty-four hours; during this time carbonic acid is given off. These phenomena plainly indicate the cause of the heat during the period of fertilization. An enquiry of interest suggests itself from these facts, as to the changes effected on the flower by these operations. The disk and petals are now supposed to act an important part in the process of fertilization, and that the process of fertilization is the same as that of germination. The following conclusion confirms this hypothesis. In both cases oxygen is absorbed, and an equal quantity of carbonic acid given off. In both cases amylaceous

substances disappear, and a saccharine substance is generated. Heat also is alike generated in both cases. The constitutions of the disk and petals have been found to be similar to the nourishing parts of the seed. From these facts it has been concluded that the most important function of the disk and petals is to afford nourishment to the pollen and ovule, and the greatest vigor of these organs, is exhibited during the process of fertilization. After this effect has been accomplished, these organs wither. The honey which is found in such abundance in flowers, is the excess of the saccharine production over what was required for the perfection of the pollen, and the nourishment of the ovule. This excess serves for the support of numerous insects, and yields the store laid up by the Bee, which is gathered without injury to the plant.

Section 3. *Water.*

We have already had occasion to remark on the importance of water in vegetation, it being the only vehicle by which the plant receives its nourishment, and by its decomposition and solidification constituting a considerable part of vegetable products. It only remains for us to notice a few other points connected with the operations of this agent. This element as it exists in the earth, holds in solution various earths and alkalis, and vegetable and animal substances, and on this account determines in a great measure the *habitat* of particular families of plants. Those waters which contain much vegetable substance, nourish those vegetables whose tissues abound in carbon, as our forest trees. The cruciferous plants, into whose composition nitrogen enters as an element, seek localities in which the waters may be more or less impregnated with animal substances. Some families of monocotyledons, which contain more or less of silex, flourish but in those situations where the water by which they are nourished passes through silicious soils. Leguminous plants are decidedly partial to those waters which contain lime in greater or less abundance. But the most decided influence exerted on vegetables is that of saltwater. Many species of vegetables cannot flourish when supplied with water which does not hold salt in solution. These plants are such as have soda as a necessary ingredient in their composition.

Water also varies very much the texture of plants according to the quantity which enters into the tissues. Those vegetables which have leaves with few pores are succulent,

with loose distended cellular tissue, as in the mesembryanthemum, while in those furnished with abundant pores, the tissues are more compact and rigid.

Some plants will live only in moist situations, while others will avoid such localities and flourish in dry sandy situations. The Fungi requiring moisture are sent forth in profusion under circumstances in which the Arenarias would perish from the abundance of moisture.

END OF PART I.

ANALYSIS.

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Flowering Plants.	*Class* I. Exogens, or Dicotyledons.	*Sub-Class* I.	Polypetalæ.	i.
		" " 2.	Monopetalæ.	viii.
		" " 3.	Apetalæ.	xiv.
		" " 4.	Achlamydeæ.	xvi.
	Class II Endogens or Monocotyledons.	*Sub-Class* 1.	Petaloideæ.	xvi.
		" " 2.	Glumaceæ.	xix.

Class I. EXOGENS.

Plants with bark, wood and pith distinct. *Leaves* and *Floral envelops* with reticulated veins.

Division I. DICHLAMYDEÆ.

Plants having two distinct floral envelopes; the outer one called the *Calyx*; the inner one the *Corolla*.

Exceptions. Clematis, Thalictrum, Anemone, Hydrastis, Trautvetteria.

Sub-Class I. POLYPETALÆ.

Corolla consisting of several distinct pieces; each peice being called a *petal*.

Section I. THALAMIFLORÆ.

Stamens hypogynous, very seldom adhering to the ovary.

(*a*) *Flowers perfect; stamens numerous, occasionally but few. Herbaceous plants.*

Order 1. Ranunculaceæ. Sepals 3–6, usually 5, deciduous. Petals 3–15

Carpels usually numerous; sometimes few or solitary. Fruit dry, achenia folicular, or baccate. Herbaceous plants or somewhat shrubby climbing vines, with a transparent acrid juice. Page 1.

Sub-Order 1. ANEMONEÆ. Achenia numerous, with plumose tails, or terminated with a subulate style. Petals none. Sepals petaloid. Involucre sometimes very much resembling sepals.
Genera. Clematis p. 1 Anemone p 3. Hepatica p. 4.

Sub Order 2. RANUNCULEÆ. Achenia numerous, in somewhat globose heads. Petals with a nectariferous scale at the base. Anthers extrorse. Herbaceous plants.
Genera. Ranunculus p. 4. Myosurus p. 8. Adonis p. 9.

Sub-Order 3. HELLEBOREÆ. Petals irregular, or wanting. Calyx petaloid. Fruit follicular, with several seeds. Herbaceous plants.
Genera. Caltha p. 6. Aquilegia p. 6. Delphinum p. 6. Aconitum p. 7.

Sub-Order 4. CIMICIFUGEÆ. Sepals petaloid caducous. Petals very small, or none. Carpels few, or solitary, folicular or baccate, sometimes 1-seeded and indehiscent. Herbaceous plants with the leaves compound, or more or less divided.
Genera. Actea p. 8. Cimicifuga p. 8. Trautvetteria p. 8. Thalictrum p. 3. Zanthorhiza p. 9.

Sub-Order 5. HYDRASTIDEÆ. Sepals 3. Petals none. Fruit baccate, 1–2-seeded. Herbaceous plant, with yellow, bitter root. Leaves palmately lobed.
Genus. Hydrastis p. 4.

Order 11. PAPAVERACEÆ. Sepals 2–3, caducous. Petals 4–6. Stamens generally numerous. Fruit 1-celled, with parietal placentæ. Herbaceous plants with a milky juice, yellow and red. Flowers white or yellow, p. 17.
Genera. Argemone p. 18. Sanguinaria p. 18. Chelidonium p. 18. Glaucium p. 18.

Order 9. NYMPHÆACEÆ. Sepals 5–6. Petals numerous, imbricate. Filaments petaloid. Fruit many celled, many seeded. Aquatic plants with large white or yellow flowers, floating on the surface of ponds or still waters.
Genera. Nymphæa p. 16. Nuphar p. 16.

Order 10. SARRACENIACEÆ. Sepals 5. Petals 5, unguiculate. Stigma very large, petaloid, forming a shelter for the stamens. Leaves all radical, pitcher shaped. Herbaceous plants, growing in wet places.
Genus. Sarracenia p. 17.

Order 31. MALVACEÆ. Sepals 5, more or less united. Petals equal the number of sepals. Stamens numerous, monadelphous. Anthers reniform. Fruit capsular. Herbaceous plants with alternate leaves.
Genera. Malope p. 48. Malva p. 49. Modiola p. 49. Sida p. 49 Hibiscus p. 50.

Order 18. CISTACEÆ. Sepals 5, unequal, the 2 outer ones smallest or wanting. Petals 5, with a twisted æstivation. Stamens distinct, usually numerous. Herbaceous plants, with white or yellow flowers.
Genera Helianthemum p. 32. Lechea p. 33.

Order 8. NELUMBIACEÆ. Sepals 4–6. Petals numerous, from the outside of the disk. Stamens numerous, filaments petaloid. Disk large, with the ovaries lodged in small cavities in its substance. Aquatic plants, growing in deep waters, with very large, pale yellow flowers, p. 15.
Genus. Nilumbium p. 15.

(*b*) *Flowers perfect. Stamens numerous. Herbaceous plants, or small shrubs.*

Order 19. HYPERICACEÆ. Sepals 4 or 5, persistent, unequal. Petals hypogynous, as many as the sepals. Stamens numerous, polydelphous. Anthers versatile. Styles several, persistent. Seeds numerous. Herbaceous and shrubby plants, with opposite, entire leaves.
Genera. Ascyrum p. 34. Hypericum p. 34. Elodea p. 36.

Order 42. CALYCANTHACEÆ. Sepals and petals confounded, united at the base; segments dark colored. Stamens numerous. Seeds numerous, contained in an enlarged coriaceous calyx. Small shrubs with purple flowers.
Genus. Calycanthus p. 85.

(c) *Flowers perfect. Stamens numerous, except sometimes in Corchorus. Usually large trees, sometimes small trees and shrubs.*

Order 2. MAGNOLIACEÆ. Sepals 3–6, deciduous. Petals 3–30, in several rows. Stamens numerous, with short filaments. Carpellæ in one or several rows. Trees and shrubs with alternate entire, coriaceous leaves. Flowers generally large and fragrant.
Genera. Illicium p. 9 Magnolia p. 10. Liriodendron p. 11.

Order 3. ANONACEÆ. Sepals 3. Petals 6, coriaceous, arranged in two rows. Filaments short, angular. Ovaries numerous. Fruit pulpy, several seeded. Small trees or shrubs, with alternate entire leaves.
Genus. Asimina p. 11.

Order 32. TILIACEÆ. Sepals 4–5. Petals 4–5. Stamens numerous, distinct. Ovary consisting of from 4–10 united carpels, with as many stigmas. Trees, except Corchorus, which is nearly herbaceous, with alternate leaves and axillary flowers.
Genera. Corchorus p. 51. Tilia p. 51.

Order 30. TERNSTRŒMIACEÆ. Sepals 5, deciduous, coriaceous Petals 5, united at the base. Stamens numerous monadelphous. Ovary 5-celled. Styles 5 or 6. Fruit 5 or 6 celled. Capsule woody. Trees or shrubs, with alternate leaves, and large showy flowers.
Genera. Gordonia p. 47. Stewartia p. 48.

(d) *Flowers perfect. Stamens usually* 5. *Herbaceous plants.*

Order 16. DROSERACEÆ. Sepals 5, persistent. Petals 5, marcescent. Stamens 5, or a multiple of that number, distinct, in Parnassia perigynous. Capsule 1 celled many seeded, with parietal placentæ. Styles 2–5. Herbaceous plants, generally with glandular hairs.
Genera. Drosera p. 31. Dionæa p. 31. Parnassia p. 32.

Order 25 BALSAMINACEÆ. Sepals 5, but by the union of the two upper ones apparently only 4 or 2, lower one spurred. Petals by union apparently but 2. Stamens 5, with subulate filaments. Ovary 5-celled, with central placentæ Stigmas 5. Succulent herbaceous plants, with yellow axillary flowers.
Genus. Impatiens p. 43.

Order 23. LINACEÆ Sepals 5. persistent. Petals 5, with a twisted æstivation, unguiculate. Stamens 5. Pistils 5. Capsule 5-celled, or by spurious dissepiments 10 celled. Seeds mucilaginous. Annual plants with entire leaves, usually alternate Flowers in terminal corymbose panicles, yellow.
Genus. Linum p. 42.

Order 16. VIOLACEÆ Sepals 5, persistent, unequal, often auricled, or produced at the base. Petals 5, unguiculate, superior one usually spurred. Stamens 5. Anthers adnate. Ovary 1-celled, with 3 parietal placentæ. Herbaceous plants, with axillary flowers.
Genera. Viola p. 23. Solea p. 30.

(e) *Flowers perfect. Stamens* 6–8, *or a multiple of* 6.

Order 36. HIPPOCASTANACEÆ. Sepals 5, united into a campanulate, or tubular 5 toothed calyx Petals 4-5, unguiculate, irregular. Stamens 6–8, unequal. Ovary 3-celled. Style 1, filiform. Fruit coriaceous 1 to 3-celled. Shrubs, with opposite, palmately compound leaves. Flowers showy.
Genus. Æsculus p. 54.

Order 14. CAPPARIDACEÆ. Sepals 4, deciduous, united, forming a tube. Petals 4, cruciate, or irregular, sometimes wanting. Stamens 4–6–12 or nu-

merous. Ovary composed of two united carpels, stipitate. Fruit a 1-celled, pod-shaped capsule, many seeded. Herbaceous plants, with compound alternate leaves.

Genera. Cleomella p. 25. Gynandropsis p. 26. Polanisia p. 26.

Order 12. FUMARIACEÆ. Sepals 2, deciduous, small. Petals 4, cruciate, one or both of the outer ones spurred or saccate at the base, the two inner ones cohering at the apex, and enclosing the anthers. Stamens 6, in two parcels. Ovary 1-celled, 2-valved. Style 1, filiform. Fruit a nut or capsule, if the former 2-seeded, if the latter many seeded. Herbaceous plants, with alternate, ternately, or pinnately divided leaves. Flowers in cymes or racemes.

Genera. Dielytra p. 19. Adlumia p. 19. Corydalis p. 19. Fumaria p. 19.

Order 13. Cruciferæ. Sepals 4, deciduous, cruciate. Petals 4, cruciate, alternate with the sepals. Stamens 6, tetradynamous, the two lateral ones shortest, inserted lower than the others. Fruit a silique, or silicle, 2-celled from a spurious dissepiment. Herbaceous plants with alternate leaves often divided. Flowers in terminal racemes or corymbs.

Genera. Arabis p. 21. Cardamine p. 21. Dentaria p. 20. Nasturtium p. 21 Leavenworthia p. 22. Sisymbrium p 22. Erysimum p. 22. Warea p. 23. Sinapis p. 23. Selenia p. 23. Vesicaria p. 24. Draba p. 24. Lepidium p. 24. Thlaspi p. 327. Coronopus, p. 321.

Order 15. POLYGALACEÆ. Sepals 5, persistent, irregular, the three exterior ones smallest, the two interior and lateral ones petaloid and larger. Stamens 6–8, monadelphous. Petals 3, irregular, somewhat papilinaceous, with the keel crested. Ovary 2-celled, with a solitary pendulous ovule in each cell. Herbaceous plants, with entire leaves.

Genus. Polygala p. 26.

Order 6. BERBERIDACEÆ. Sepals in two rows 3–4–6 often surrounded by petaloid scales. Petals equal or double the number of sepals, and opposite them, generally appendaged at the base. Stamens usually 6, or a multiple of that number. Ovary solitary, 1 celled. Style lateral. Fruit baccate or capsular. Shrubs, or herbaceous plants.

Genera. Berberis p 13. Leontice p. 13. Diphyllia p. 14. Jeffersonia p. 14. Podophyllum p. 14.

Order 7. CABOMBACEÆ. Sepals 3–4, petaloid. Petals 3–4, alternate with the sepals. Stamens 6, or numerous. Ovaries 2–18. Carpels terminated by the style, 1–2-seeded. Aquatic plants, with floating peltate leaves, the submersed leaves with filiform lobes.

Genera. Cabomba p. 15. Brasenia p. 15.

(*f*) *Flowers perfect. Stamens* 10, *sometimes fewer. Herbaceous plants.*

Order 24. GERANIACEÆ Sepals 5, ribbed. Petals 5, unguiculate, distinct. Stamens 10, monadelphous. Ovary composed of 5 carpels. Styles 5. Carpels distinct in fruit, 1 or 2 seeded. Herbaceous plants, with leaves more or less divided, with the stems swollen at the joints.

Genus. Geranium p. 43.

Order 21. CARYOPHYLLACEÆ. Sepals 4–5, distinct, or united at the base. Petals 4–5, unguiculate, inserted into the pedicel of the ovary, or destitute of claws and inserted on a nearly perigynous disk. Stamens generally 10. Ovary stipitate. Pistils 2–5. Capsule 1-celled, or imperfectly 2–5-celled. Herbaceous plants with tumid nodes. Leaves opposite, entire.

Genera. Molugo p. 325. Sagina p 39. Arenaria p. 39. Stellaria p. 40. Cerastium p. 40. Silene p. 41. Saponaria p. 41.

Order 20. ILLECEBRACEÆ. Sepals 5, persistent. Petals 5, or none, or minute. Stamens 2–5. Ovary 1-celled, or imperfectly 2–5 celled. Styles 2 5. Fruits 1-celled, 1 or many seeded. Herbaceous plants, with opposite entire leaves. [See page vii.]

Order 26. OXALIDACEÆ. Sepals 5, distinct, persistent. Petals 5, unguiculate. Stamens 10, those alternate with the petals shortest. Styles 5. Cap-

sule 5-valved, 5-celled. Herbaceous plants, with an acid juice. Leaves compound, mostly alternate.

Genus. Oxalis p. 44.

Order 27. ZYGOPHYLLACEÆ. Sepals 5, persistent. Petals 5, obovate. Stamens 10, the 5 opposite the petals placed within 5 hypogynous glands. Style conical, 10-furrowed. An annual plant, diffuse or trailing. Leaves pinnately compound, usually 3 pairs.

Genus. Kallstrœmia 45.

Order 40. LEGUMINOSÆ. Calyx 5 toothed or 5 cleft, often unequal. Petals 5 or fewer, irregular. Stamens definite, perigynous or hypogynous distinct monadelphous or diadelphous. Fruit usually a legume. Herbs, shrubs and trees. Leaves alternate, generally compound. [See page vii.]

Order 33. MELIACEÆ. Sepals 5, united at the base. Petals 5, cohering at the base or attached to the stamen tube. Stamens 10, usually monadelphous. Fruit capsular, 5-celled, 1 seed in each cell. A tree (*Pride of India*) with bipinnate leaves.

Genus. Melia p. 52

(g) *Flowers polygamous, monœcious or diœcious.*

Order 37. SAPINDACEÆ. Sepals 4, unequal, two outer ones largest. Petals 4, hairy at the base. Stamens 6–8. Filaments hairy. Styles usually 3 connivent or connected. Ovary composed of three united carpels. Ovules solitary. Fruit capsular. Trees, with compound pinnate leaves. Flowers small, diœcious or polygamous.

Genus. Sapindus p. 55.

Order 35. ACERACEÆ. Sepals 5, united at the base, colored. Petals as many as the sepals or wanting. Stamens usually 8, varying from 3–12. Ovary composed of two united carpels. Fruit a samara, with the lower margin of the wing thickened. Trees or shrubs, with opposite, palmately lobed, or pinnately compound leaves. Flowers frequently polygamous, or diœcious.

Genus. Acer p. 53.

Order 4. SCHIZANDRACEÆ. Flowers monœcious. Sepals and petals confounded, 9–12. Stamens 5, with the anthers connate, nearly sessile. Carpels aggregate when not mature, but scattered on the elongated torus in maturity. A trailing shrub, with entire or denticulate leaves.

Genus. Schizandra p. 12.

Order 49. CUCURBITACEÆ. Flowers monœcious. Calyx 5-toothed, with the limb sometimes obsolete. Petals 5, distinct, or more or less united to each other and the calyx. Stamens 5, distinct, or variously united. Fruit large, fleshy. Herbaceous plants, climbing by stipular tendrils. Leaves alternate. Flowers axillary.

Genera. Bryonia p. 91. Melothria p. 94. Sicyos p. 91. Cucurbita 95.

Order 5. MENISPERMACEÆ. Flowers diœcious, sometimes polygamous. Sepals 4–8 in a double series. Petals 4–5–8, sometimes none. Stamens 3–6, or numerous, usually distinct. Climbing shrubs, or suffruticose plants. Leaves alternate simple, palmately veined.

Genera. Cocculus p. 12. Menispermum p. 12.

Order 34. VITACEÆ. Flowers diœcious, polygamous or perfect. Calyx minute, 5-toothed, or entire. Petals 4 or 5, caducous. Stamens 4 or 5, opposite the petals, inserted with them on the surface of an annular disk. Fruit pulpy, one or few seeded. Climbing shrubs. Lower leaves opposite, upper ones alternate, greenish.

Genera. Vitis p. 52. Ampelopsis p. 53.

Order 28. ZANTHOXYLACEÆ. Flowers diœcious, polygamous, or perfect. Sepals 3–9. Petals as many as the sepals, or wanting. Stamens as many, or twice as many as the petals. Ovaries equal in number to the sepals, distinct or united. Styles distinct. Fruit 2–5-celled. Trees or shrubs. Leaves pinnately divided.

Genera. Zanthoxylum p. 45. Ptelea p 45.

Section II. CALYCIFLORÆ.

STAMENS AND PETALS PERIGYNOUS.

A. Calyx superior.

(*a*) *Stamens* 5. *Herbaceous plants with the exception of Aralia.*

Order 55. Araliaceæ. Flowers polygamous or perfect. Calyx obscurely 5-toothed. Petals 5, spreading Stamens 5, alternate with the petals; filiments short. Ovary 2 or 3-celled with a solitary ovule in each cell. Styles 2. Shrubs, or herbaceous plants with compound leaves.

Genera. Aralia, Appendix ,p. 324. Panax 107.

Order 54. Umbelliferæ. Calyx adhering to the ovary, with the limb 5-toothed, or entire. Petals 5. Stamens 5. Ovary consisting of 2 united carpels. Styles 2 Fruit marked with longitudinal ribs. Herbaceous plants, usually with fistular stems. Leaves usually more or less divided. Flowers in umbels.

Genera. Hydroctyle p. 101. Crantzia p. 101. Sanicula p. 101. Eryngium p. 102. Helosciadium p. 102. Discopleura p. 103. Lepiocaulis p. 103. Cicuta p. 103. Sium p. 103. Neurophyllum p. 104. Cryptotænia p. 104. Zizia p. 104. Thaspium p. 104. Ligusticum p 105. Archangelica p. 105. Tiedmannia p. 105 Archemora p. 106. Daucus p. 106. Chærophyllum p. 106. Osmorhiza p. 106.

(*b*) *Stamens* 8. *Herbaceous plants.*

Order 43. Melastomaceæ. Sepals 4, combined into an urceolate tube, adhering to the ovary. Petals 4, alternate with the lobes of the calyx. Stamens 8. Styles declined. Capsule 4 celled, many seeded. Herbaceous plants, with opposite, ribbed leaves. Flowers showy.

Genus. Rhexia p 85.

Order 45. Rhizophoraceæ. Sepals united into a 4-lobed calyx. Petals inserted into the calyx and equalling the lobes in number. Stamens 8. Ovary 1–2-celled. Fruit 1-celled, indehiscent. A tree with entire leaves and axillary flowers.

Genus. Rhizophora p. 88.

(*c*) *Stamens varying in number.*

☞ Pomaceæ and Cornaceæ, see page vii.

Order 2. Saxifragaceæ. Sepals 4–5, united or distinct. Petals as many as the sepals. Stamens usually as many as the sepals, or double the number. Ovary free or cohering with the calyx, 1-celled, with parietal placentæ, or several celled, with central placentæ.

Sub-Order 1. Saxifrageæ. Capsule usually beaked, opening along the inner suture, or with septicidal dehiscence. Herbaceous plants.

Genera, Saxifraga p. 97. Boykinia p. 97. Heuchera p. 97. Astilbe p. 98. Chrysosplenium p 98. Lepuropetalon p. 98.

Sub-Order 2. Escallonieæ. Calyx 5-cleft, with subulate segments. Petals 5, with incurved points. Stamens 5, with subulate filaments. Capsule 2-celled A shrub with alternate, serrulate leaves. Flowers white.

Genus. Itea, App. 323.

Sub-Order 3. Hydrangeæ. Capsule dehiscing between the styles when they are not united, otherwise the dehiscence is irregular. Shrubs and vines with opposite leaves.

Genera. Hydrangea p. 99. Decumaria p. 99.

Sub-Order 4. Philadelpheæ. Æstivation convolute. Stamens 20–40. Capsule with a loculicidal dehiscence. Shrubs, with opposite, simple leaves.

Genus. Philadelphus p. 99.

Order 56. Onagraceæ. Sepals united into a tubular calyx, with the limb 3–4-6-parted. Petals equal in number to the segments, or wanting. Stamens varying in number from 2–10. Pollen triangular. Ovary cohering to the calyx, generally 2–4-celled. Placentæ central. Fruit usually capsular, indehiscent, or with a loculicidal dehiscence. Herbaceous plants, with simple, entire, or toothed leaves.

Sub-Order 1. Onagreæ. Calyx usually 4-lobed, sometimes 6. Stamens and petals equal, half, or double the number of the segments, regular. Fruit capsular, occasionally dry and indehiscent. Herbaceous plants.

Genera. Epilobium p. 89. Œnothera p. 89. Gaura p. 90. Jussiæa p. 91. Ludwigia.

Sub-Order 2. Haloragieæ. Calyx 3–4 parted. Petals 3–4, or wanting. Stamens 3–4–8. Ovary 3–4 celled, with a solitary ovule in each cell. Style none. Stigmas equal the number of cells. Aquatic herbaceous plants, with alternate, opposite, or verticillate leaves. Flowers small, axillary, sessile, sometimes monœcious, or diœcious.

Genera. Proserpinaca p. 92. Myriophyllum p. 93.

Order 53. Hamamelaceæ. Calyx 4–5-cleft, or with 5–7 obscure teeth. Petals 4–5, spiral, sometimes none. Stamens 4–8, or numerous. Styles 2. Capsule 2 celled, opening at the apex, 1 seed in each cell. Shrubs with feather veined leaves. Flowers sometimes polygamous.

Genera. Hamamelis p. 100. Fothergilla p. 100.

Order 50. Cactaceæ. Sepals numerous, imbricate. Petals numerous in several series. Stamens numerous. Anthers versatile. Ovary 1-celled. Ovules numerous. Succulent plants destitute of leaves. Flowers showy, sessile.

Genus. Cactus p. 95.

B. Calyx inferior.

Order 30. Illecebraceæ. Sepals 5, persistent. Petals 5, or none, or minute. Stamens 2–5. Ovary 1-celled, or imperfectly 2–5-celled. Styles 2–5. Fruit 1-celled, 1 or many seeded. Herbaceous plants, with opposite entire leaves.

Sub-Order 1. Illecebreæ. Petals wanting, or resembling sterile filiments. Styles or stigmas 2. Fruit 1 seeded. Leaves opposite, often crowded and fascicled.

Genera. Paronychia, p. 37. Anychia p. 37. Siphonychia p. 38.

Sub-Order 2. Spergulieæ. Petals distinct or wanting. Styles or stigmas 3–5. Capsule 1-celled many seeded, with a central placenta.

Genera. Stipulicida p. 38. Polycarpon p. 38. Spergula p. 38.

Order 29. Anacardiaceæ. Flowers perfect or diœcious. Sepals 5. Petals 5, or wanting, inserted into a glandular disk in the bottom of the calyx. Stamens usually 5. Ovary solitary, 1-celled. Styles usually 3. Fruit 1-seeded, drupaceous. Trees or shrubs. Flowers usually in panicles, axillary or terminal.

Genus. Rhus p. 46.

Order 48. Passifloraceæ. Calyx 5-parted, with a filamentous crown, inserted into the throat. Petals 5. Stamens 5. Stigmas 3, clavate. Fruit pulpy. Flowers axillary. Climbing herbaceous plants, with alternate leaves.

Genus. Passiflora p. 94.

Order 47. Turneraceæ. Sepals 5, united, with the segments equal. Petals 5. Stamens 5. Ovary 1-celled with three parietal placentæ. Styles 3. Seeds numerous. Herbaceous plants, with simple alternate leaves.

Genus. Turnera p. 93.

Order 22. Portulaceæ. Sepals 2, cohering at the base. Petals 5. Stamens 8–20. Style 3–6-cleft at the apex. Capsule 1-celled, dehiscing transversely. Seeds numerous. Succulent plants.

Genera. Claytonia p. 42. Portulacca App.

Order 51. Crassulaceæ. Calyx 4–5-cleft. Petals 4–5. Stamens 8–10. Ovaries 5, usually distinct. Seeds numerous. Succulent plants.

Genera. Sedum p. 96. Diamorpha p. 96. Penthorum p. 96.

Order 40. LEGUMINOSÆ. Calyx 5-toothed or 5-cleft, often unequal. Petals 5 or fewer, irregular. Stamens definite, perigynous or hypogynous, distinct, monadelphous or diadelphous. Fruit usually a legume. Herbs, shrubs and trees. Leaves alternate, generally compound.

Genera. Vicia p. 58. Ervum p. 58. Lathyrus p. 58. Phaseolus p. 59. Vigna p. 59. Dolichos p. 59. Erythrina p. 60. Apios p. 60. Wistaria p. 60. Rhynchosia p. 61. Pitcheria p. 61. Galactia p. 62. Clitoria p. 62. Amphicarpa p. 63. Sesbania p. 63. Glottidium p. 63. Robina p. 63. Tephrosia p. 64. Indigofera p. 65. Psoralea p. 65. Amorpha p. 66. Dalea p. 66. Petalostemum p. 67. Trifolium p. 67. Melilotus p. 68. Medicago p. 68. Astragalus p 68. Phaca p. 68. Zornia p. 69. Stylosanthes p. 69. Æschynomene p. 69. Hedysarum p. 70. Lespedeza p. 71. Crotalaria p. 72. Lupinus p. 73. Baptisia p. 73. Cercis p. 74. Cassia p. 74. Gleditschia p. 75. Mimosa p. 76. Schrankia p. 76. Acacia p. 77.

Order 41. ROSACEÆ. Sepals usually 5, persistent. Petals 5, regular, occasionally wanting. Stamens numerous, or very rarely few. Herbaceous plants, shrubs and trees. Leaves alternate. Flowers occasionally polygamous, or diœcious.

Sub-Order 1. CHRYSOBALANEÆ. Ovary free. Petals and stamens irregular Fruit a drupe. Small shrubs, with prostrate slender stems.

Genus. Chrysobalanus p 77.

Sub-Order 2. AMYGDALEÆ. Ovary free, with 2 suspended ovules. Fruit a drupe. Seed solitary. Trees or shrubs, with simple leaves. Bark yielding gum.

Genera. Prunus p. 77. Cerasus p. 78.

Sub-Order 3. ROSACEÆ. Ovaries solitary, or several. Fruit folicular 1–10-seeded, or 1-seeded achenia. Herbs or shrubs, with simple or compound leaves.

Genera. Spirea p. 78. Gillenia p. 79. Geum p. 79. Waldsteinia p. 79. Agrimonia p. 80. Potentilla p. 80. Fragaria p. 81. Rubus p. 81. Rosa p. 82.

Sub-Order 4. POMACE . Ovaries 2–5, cohering with the calyx and sometimes with each other, with 2 ascending ovules. Styles terminal. Fruit a pome, 1-5-celled. Trees or shrubs.

Genera. Crategus p. 82. Pyrus p. 84. Amelanchier p. 84.

(*b*) *Capsules usually more than* 1*-celled.*

Order 44. LYTHRACEÆ. Calyx 4–6-lobed or toothed, sometimes with as many small accessory teeth or processes. Petals as many as the lobes of the calyx or wanting. Stamens as many as the petals or some multiple of the number. Ovary 2–4-celled, the dissepiments sometimes becoming obliterated and the capsule 1 celled. Herbaceous plants, growing usually in wet soils, with 4-sided branches.

Genera. Hypobrichia p. 86 Ammania p. 87. Lythrum p. 87. Decodon p 87. Cuphea p. 83.

Order 38. CELASTRACEÆ. Sepals 4–5 united at the base. Petals and stamens equalling them in number; the latter inserted into a broad disk at the bottom of the calyx. Fruit 2–5-celled, or by abortion 1-celled. Shrubs.

Genera. Staphylea p. 55. Euonymus p. 56.

Order 39 RHAMNACEÆ. Calyx tubular 4–5 cleft. Petals 4–5, or wanting cucullate or convolute. Stamens 5. Fruit capsular or baccate. Seeds solitary. Shrubs, sometimes with thorny branches.

Genera. Rhamnus p. 56. Sageretia p. 57. Berchemia, App 324. Ceanothus p. 57.

(*c*) *Calyx partly superior.*

Order 56 CORNACEÆ Calyx adhering to the ovary, 4-toothed. Petals 4, oblong. Fruit baccate, crowned by the calyx. Small trees and shrubs, with astringent bark. Flowers in cymes.

Genus. Cornus p. 107.

(*d*) *Flowers monœcious or diœcious.*

Order 57 Loranthaceæ. A shrubby parasite, growing on the branches of trees, with evergreen leaves. *Mistletoe.*
Genus. Viscum p. 108.

Sub-Class II. MONOPETALÆ, OR GAMOPETALÆ.

Flowers in which the petals are united forming a tube of greater or less length.

The following genera are uniformly, or frequently polypetalous, Mylocarium, Clethra, Cyrilla, Bejaria, Rhalesia, Statice, Monotropa, and sometimes apetalous as in Fraxinus.

(*a*) *Ovary inferior. Corolla regular.*

Order 75 Compositæ. Flowers collected into a dense head, surrounded by an involucre. Stamens 5, united by their anthers. Stigmas 2, distinct or united.

In the arrangement of this large family of plants, we have adopted in our analysis the plan of DeCandolle, as given in the 5th 6th and 7th volumes of his Prodromus. When the Order *Compositæ* was written we gave preference to a different arrangement; but from more experience, we deem this the best adapted to aid the student in the analysis of this difficult Order.

Tribe 1. *Vernoniaceæ.* Flowers discoid, perfect. Style cylindrical below, equally divided above, longitudinally hispid, the divisions generally long, subulate.

Corolla 5-cleft, usually regular, sometimes obscurely bilabiate. Pollen globose. Capitula few or many flowered. Flowers blue or purple.
Genera. Spergnophoros p. 198. Vernonia p. 167. Stokesia p. 141. Elephantopus. p. 172.

Tribe 2. *Eupatoriaceæ.* Florets perfect, discoid. Style cylindrical below, divided above, with the divisions long, terete, or clavate, exserted.

Corolla regular, 5-cleft, with the segments erect. Pollen globose, echinate. Capitula few or many flowered. Pappus setaceous, scabrous or plumose. Flowers blue or purple.
Genera. Kuhnia p. 182. Liatris p. 141. Eupatorium p. 183. Mikania p. 182.

Tribe 3. *Asteroideæ.* Capitula usually heterogamous, seldom homogamous or dioecious. Style cylindrical below, bifid: divisions long, linear, usually acuminate, puberulent. Staminate florets tubular regularly toothed.

(*a*) Receptacle naked. Flowers radiate, with the ray florets in one series, blue or purple. Pappus pilose, in several series.
Genus. Aster p. 173.

(*b*) Ray florets in several series, fertile. Pappus pilose, in one series. Receptacle naked.
Genus. Erigeron p 181.

(*c*) Ray florets in one series, fertile, white, or pale purple. Pappus paleaceous.
Genera. Boltonia p. 182. Chrysopsis p. 170.

(*d*) Ray florets in one series or more, when present, pistillate, yellow. Pappus pilose, in one series.
Genera. Solidago p. 177. Chrysocoma p. 173.

(*e*) Capitulum many flowered. Florets all tubular; the several outer series radiate, yellow, disk florets 5-toothed, sterile. Involucre in many series. Pappus pilose, in one series.
Genus. Conyza p. 169.

(*f*) Capitulum many flowered, diœcious. Corolla tubular, 5-cleft.
Genus. Baccharis p. 163.

(*g*) Capitulum many flowered. Florets all tubular, outer ones fertile, slender; inner ones staminate, or perfect, 5-toothed.
Genus. Pterocaulon p. 169.

(*h*) Capitulum many flowered. Ray florets ligulate, pistillate.
Genus Buphathalmum p. 172.

(*i*) Capitulum many flowered. Ray florets in one series, pistillate, disk florets tubular, 4-toothed, perfect. Pappus usually none. Leaves opposite.
Genera Eclipta p 171. Siegesbeckia p. 189.

Tribe 4. *Senicioideæ*. Style cylindrical at the apex, In perfect flowers bifid, with the divisions elongated, linear, pencillate, sometimes truncate, at others produced beyond the pencil into a short cone or narrow, hispid appendix. Stigmatic surface broad, and prominent, extending to the pencil, or to the origin of the cone or appendix. Corolla of the disk pellucid, regular. Pollen globose, echinate.

Sub-Tribe 1. *Melampodineæ*. Flowers monœcious or diœcious, never perfect. Anthers not acuminate. Receptacle usually chaffy. Pappus never setaceous.
Genera. Chrysogonum p. 198. Silphium p. 196. Polymnia p. 197. Xanthium p. 200. Ambrosia p. 200. Iva p. 199. Parthenium p. 199.

Sub-Tribe 2. *Helianthcæ*. Capitula either heterogamous and radiate, or perfect and discoid. Receptacle all chaffy, or only the margin. Lobes of the perfect flowers thick. Pappus none, a margin or awns. Anthers blackish, not acuminate. Leaves often opposite.
Genera. Melananthera p 187. Heliopsis p. 188. Tetragonotheca p. 189. Rudbeckia p. 194. Coreopsis p. 192. Helianthus p. 189. Actinomeris p. 189. Bidens 192. Verbesina p. 199. Acmella p. 183.

Sub-Tribe 3. *Helenieæ*. Capitula often heterogamous, radiate. Ray florets ligulate, pistillate, or neutral, in one series. Disk florets usually perfect. Anthers often dark colored, with the base somewhat produced, not acuminate. Branches of the style sometimes truncate at the summit, at others extended by a cone or appendix above the hairs. Pappus paleaceous, many leaved, in one series, scarious; sometimes by abortion wanting.
Genera. Gaillardia p. 327; Baldwina 194. Leptopoda p. 194. Hymenopappus p. 187. Polypteris p. 186. Helenium p. 188. Marshallia p. 187.

Sub-Tribe 4. *Anthemideæ*. Capitula usually heterogamous, never diœcious. Ray florets usually in one series, pistillate or neutral, ligulate, or if tubular, bilabiate. Disk florets tubular, 4–5-toothed, usually perfect. Branches of the style bearded, and truncate at the summit, in a few cases extended into a cone. Pappus usually wanting, or a margin. Leaves usually alternate.
Genera Anthemis p. 198. Achillea p. 199. Santolina p. 198. Chrysanthemum p. 188. Artemisia p. 198. Gymnostyles, or *Soliva* p. 172.

Sub Tribe 5. Capitula homogamous, or heterogamous. Corolla tubular, 5-toothed, diœcious, or with the exterior florets pistillate, and the central ones perfect. Anthers acuminate. Pappus pilose, or setaceous, sometimes clavate. Plants usually covered with a soft pubescence.
Genera. Gnaphalium p. 169. Antennaria p. 169.

Sub-Tribe 6. *Senecioniæ*. Capitula homogamous or heterogamous, never diœcious; discoid, or radiate. Receptacle naked. Anthers not acuminate. Pappus pilose or setaceous. Leaves alternate. The exterior seeds clavate.
Genera. Arnica p. 170. Cacalia p. 185. Senicio p. 186.

Tribe 5. *Carduaceæ, or Cynareæ*. Florets all tubular, perfect, or with the ray florets pistillate, and of the disk staminate. Receptacle chaffy. Stigma articulated. Leaves alternate, often spiny.
Genera. Cnicus p. 140. *Carduus*, or *Cirsium*. Centauria p. 141.

Tribe 6. *Mutisiaceæ*. Capitula heterogamous Ray florets in a double series, the inner series pistillate, with long styles; disk florets staminate, bilabiate. Receptacle naked. Pappus pilose.
Genus. Chaptalia p. 187.

Tribe 7. *Chicoraceæ.* Flowers all ligulate and perfect. Corolla split on one side, thus making it ligulate, 5-toothed, 5-nerved. Pollen multangular, scabrous. Milky plants with alternate leaves.

Genera. Heracium p. 136. Prenanthes p. 137. Læontodon p. 138.—Krigia p. 138. Apargia p. 138. Lactuca p. 138. Borkhausia p. 139. Sonchus p. 139. Cichorium p. 140.

Order 76. Dipsaceæ. Flowers collected into an ovate or roundish head. Corolla 4-cleft, stamens 4 distinct. *Teasel.*

Genera. Dipsacus p. 201.

Order 72. Cinchonaceæ. Calyx superior 2-4-5 parted, with connate bracteæ at the base. Corolla superior, tubular, with as many divisions as the calyx. Stamens 4-5. Fruit a capsule, usually 2-celled, 1 or 2 seeds in each cell; or a succulent berry 4-seeded. Herbs or shrubs with opposite entire leaves with intermediate stipulæ.

Genera. Spermacoce p. 131. Diodia p. 131. Cephalanthus p. 131.—Hedyotis p. 132. Pinckneya p. 132. Mitchella p. 132.

Order 74. Stellatæ. Calyx 4 lobed. Corolla rotate or tubular. Stamens 4. style 1. Fruit didymous, 2-seeded. Herbaceous plants with angular stems and verticillate leaves. Flowers minute.

Genera. Galium p. 135. Rubia p. 136.

Order 73. Caprifoliaceæ. Calyx superior 5-cleft or 5 toothed. Corolla varying in every respect in the different genera. Stamens 5. Style 1; Stigmas 1-3. Fruit indehiscent, usually fleshy, 1-5 celled, crowned by the calyx. Shrubs, often climbing, with opposite leaves.

Genera. Caprifolium p. 133. Diervilla p. 133. Sambucus p. 135. Symphoria p. 133. Triosteum p. 133. Viburnum p. 134.

Order 71. Campanulaceæ. Calyx 5-cleft, persistent. Corolla campanulate, 5 cleft, marcescent. Stamens 5. Stigma 3-cleft. Capsule 3-celled, many seeded, dehiscing by pores. Herbaceous plants.

Genus. Campanula, p. 130.

Order 60. Vaccineæ. Calyx 4—5 toothed. Corolla with as many segments as the calyx, urceolate or campanulate. Stamens 8—10; anthers tumid at the base. Fruit succulent. Shrubs, with alternate leaves.

Genera. Vaccinium p. 115. Oxycoccus p. 116.

(*b*) *Ovarium superior. Corolla regular. Stamens* 5.

Order 91. Boragineæ. Calyx 5-cleft. Corolla 5-cleft. Nuts 4, distinct. Herbaceous plants, with alternate, scabrous leaves. Flowers in secund spikes or racemes.

Genera. Lithospermum p. 227. Batschia p. 228. Cynoglossum p. 228. Onosmodium p. 223. Pulmonaria p. 228. Myosotis p. 223.

Order 88. Apocyneæ. Calyx 5-cleft, persistent. Corolla 5 lobed, with twisted æstivation. Stamens 5. Ovaries 2. Stigma 1. Fruit foliacular, long, slender. Plants usually with a milky juice, and entire leaves. Herbaceous plants or a shrubby vine.

Genera. Apocynum p. 223. Amsonia p. 223. Echites p. 224. Gelseminum p. 224.

Order 79. Plumbagineæ. Calyx tubular, plaited, 10-toothed. Ovules inverted. Stigmas 5. Herbaceous plants with sheathing leaves. Flowers in panicles, blue.

Genus. Statice p. 202.

Order 92. Heliotropiaceæ. Calyx 5-parted, persistent. Ovary 4-celled, with a solitary ovule in each cell. Style 1. Fruit drupaceous, easily divided. Herbaceous plants, with alternate simple leaves. Flowers in spikes.

Genus. Heliotropium p. 229.

Order 63. Sapoteæ. Calyx 5-cleft. Corolla 5-cleft, salver-form. Style 1. Fruit baccate, 1-seeded. Trees or shrubs, generally with spiny branches—

Leaves alternate, entire, coriaceous. Flowers clustered, inconspicuous.
Genus. Bumelia p. 120.

Order 67. CONVOLVULACEÆ. Calyx 5-parted, persistent. Corolla 5-lobed, plaited. Capsule 1–4 celled, with the seeds borne at the base of the placentæ. Twining or creeping plants, with alternate, ex-stipulate leaves.
Genera. Convolvulus p 124. Ipomea p 125. Cuscuta p 125. Dichondra p 125.

Order 89. ASCLEPIADEÆ. Calyx 5-cleft. Corolla 5 lobed, contorted. Stamens 5: filaments connate; pollen waxy, adhering to the processes of the stigma. Fruit a follicle, single or double. Plants with a milky juice, sometimes climbing.
Genera. Asclepias p. 224. Gonolobus p. 226.

Order 69. HYDROLEACEÆ. Calyx 5 parted, æstivation imbricate. Corolla campanulate. Ovary 2-celled, surrounded by an annular disk. Flowers numerous, axillary and terminal. In wet places.
Genera. Hydrolea p. 128. Diapensia p. 129.

Order 93. HYDROPHYLLEÆ. Calyx 5-cleft, persistent. Corolla campanulate, 5-lobed with 2 lamellæ at the base of each lobe. Fruit 1–2-celled, 2-valved, 1–4-seeded. Herbaceous plants, hispid, with divided leaves.
Genera. Hydrophyllum p. 229. Phacelia p. 229.

Order 68. POLEMONIACEÆ. Calyx 5-parted, persistent. Corolla 5-lobed Style 1. Capsule 3-celled, with loculicidal dehiscence. Herbaceous plants, generally with opposite leaves.
Genera. Phlox p. 126. Polemonium p 127. Cantua p 128 Collomia p. 128.

Order 94. SOLANEÆ. Calyx usually 5-parted, sometimes 4. Corolla regular, except in *Verbascum*, usually 5-lobed, plaited. Fruit capsular or baccate Seeds numerous. Herbaceous plants, with alternate leaves
Genera. Solanum p. 230. Physalis 230. Atropa p. 325. Nicotiana p 231 Datura p. 231. Lycium p. 231. Verbascum 232.

Order 77. SPIGELIACEÆ. Calyx 5-parted. Corolla tubular, long, ventricose, 5-lobed. Capsule 2-celled. Herbaceous plants, with opposite entire leaves Flowers in a secund spike, red.
Genus. Spigelia p. 222.

(*c*) *Stamens varying in number. Corolla sometimes irregular.*

Order 65. STYRACEÆ. Calyx 4–5-cleft. Corolla 4–5-parted, or 4-petaled. Stamens 8–10–12, somewhat monadelphous. Fruit 1–8-celled. Shrubs, with alternate, exstipulate leaves. Flowers axillary, white.
Genera. Hopea p. 327. Styrax p 121. Halesia p. 122.

Order 61. PRIMULACEÆ. Calyx 4-cleft. Corolla 4–5-cleft. Stamens inserted upon the corolla opposite the segments, 2–4–5. Style 1. Capsule 1-celled, many seeded, with central placentæ. Herbaceous plants with opposite, or whorled leaves. Flowers yellow, white or red.
Genera. Lysimachia p 117. Centunculus p. 118. Hottonia 118. Anagallis 118. Samolus 118. Micranthemum 118.

Order 90. OLEACEÆ. Flowers perfect or dicœcious Calyx usually 4-toothed or wanting. Corolla usually 4-cleft, 4-petaled, or wanting, sometimes the lobes very long. Trees and shrubs, with opposite leaves.
Genera. Olea p. 226. Chionanthus p. 227. Fraxinus p. 227.

Order 77 PLANTAGINEÆ Calyx 4-parted, persistent Corolla 4-cleft Stamens 4. Style 1. Stigma hispid. Herbaceous plants, with the flowers in spikes, inconspicuous, white or yellowish, and leaves all radical.
Genus. Plantago p. 201, and p. 328.

Order 64. EBENACEÆ. Flowers dicœcious. Calyx 4–6-cleft. Corolla urceolate. Stamens 8–16. Stigmas 4–5 in the fertile flowers. Trees and shrubs, with alternate leaves. *Persimmon.*
Genus. Diospyros. p. 121.

Order 59. ERICEÆ. Calyx 4–5-cleft. Corolla 4–5-cleft, regular or irregular, often polypetalous. Stamens most commonly 10, but varying from 5–8–14

Style 1, straight. Fruit capsular or baccate. Shrubs or under shrubs. Leaves usually evergreen, entire, whorled or opposite.

Genera. Mylocarium p. 110. Elliottia p. 110. Gualtheria p. 110 Clethra 111. Menziesia p. 111. Andromeda p. 111. Cyrilla p. 113. Kalmia p. 113. Rhododendron p. 113. Epigæa p. 114. Leiophyllum p. 114. Bejaria p. 114. Azalea p. 114.

Order 58. PYROLACEÆ. Calyx 5-parted. Corolla 5-toothed. Stamens 10. Style 1. Capsule 5 celled, with central placentæ. Seeds numerous, winged. Herbaceous plants, sometimes parasitic with roots of trees.

Genera. Pyrola p 109. Chimaphila 109. Monotropa 109.

Order 86. GENTIANEÆ. Calyx 2–4–5–10 cleft. Corolla tubular 4–5–10-cleft, often somewhat irregular. Stamens equal in number to the segments of the corolla included. Stigmas 1–2. Capsule 1-celled, many seeded. Herbaceous plants, with opposite, sessile, entire leaves. Flowers terminal or axillary

Genera. Gentiana p. 219 Frasera p. 220. Sabbatia p. 220. Centaurella p. 221. Mitreola p. 325. Houstonia p. 221. Polypremum 222. Villarsia p. 222. Obolaria p. 222.

(c) *Flowers irregular. Exc. Ruellia, Elytraria.*

Order 70. LABIATÆ. Calyx tubular, 5–10-toothed, inferior. Corolla bilabiate; the upper lip entire or bifid, the lower 3-cleft. Stamens 4, didynamous, sometimes but 2. Ovary 4-lobed. Style 1, arising from the base of the lobes Fruit 1–4 small nuts. Herbaceous plants, with 4-angled stems, and opposite leaves.

Genera. Lycopus 202. Mentha 203. Pycnanthemum 203. Hyssopus 204. Teucrium 204. Collinsonia 205. Ceranthera 205. Monarda 206. Leonurus 206. Lamium 206. Dracocephalum 206. Stachys 207. Nepeta 207. Marrubium 207. Macbridea 208. Hedeoma 208. Calamintha 208. Prunella 208. Scutellaria 209. Salvia 209. Hyptis 210.

Order 71. Verbenaceæ. Calyx tubular, inferior. Corolla generally with an irregular limb. Stamens 4, (sometimes 2) didynamous. Fruit drupaceous or baccate. Style terminal. Herbaceous plants and shrubs. Leaves generally opposite. *Genera.* Priva p. 326. Verbena p. 210. Callicarpa 211. Zapania 211. Lantana 211.

Order 60 LOBELIACEÆ. Calyx 4–5 cleft. Stamens 5, united into a tube by the anthers. Ovary inferior. Style simple. Stigma surrounded by a cup-like fringe. Fruit capsular, many seeded, dehiscing at the apex. Herbaceous plants with alternate leaves. *Genus.* Lobelia p. 129.

Order 82. BIGNONIACEÆ. Calyx divided, sometimes spathaceous. Corolla 4–5-lobed. Stamens 5, 1–3 of them sterile. Capsule 1–2-celled, many seeded. Seeds compressed, usually winged. Trees or vines, with the leaves usually opposite.

Genera. Bignonia 212. Catalpa 212.

Order 83. PEDALINEÆ. Calyx 5-cleft. Corolla bilabiate, 5-lobed. Stamens 4, didynamous. Fruit a ligneous capsule, terminated by 2 curved beaks. Herbaceous plants, viscidly pubescent, with alternate leaves, and axillary flowers.

Genus. Martynia p. 212.

Order 62. LENTIBULARIÆ. Calyx bilabiate, undivided or 5-cleft. Corollla bilabiate, spurred. Stamens 2. Anthers 1-celled. Style 1. Stigma bilamellate. Capsule 1-celled, many seeded. Herbaceous plants with no, or only radical leaves, growing in swamps and wet places.

Genera. Pinguicula p. 119. Utricularia p. 119.

Order 75. ACANTHACEÆ. Calyx 4–5-cleft, with equal or unequal segments. Corolla hypogynous with a regular or irregular border. Stamens 2-4, or 5 when didynamous or nearly equal. Style 1. Capsule 2-celled, few or many seeded, dissepiments opposite the valves. Herbaceous plants with opposite simple leaves.

Genera. Justicia p. 218. Ruellia p. 218. Elytraria p. 219.

Order 84. SCROPHULARINEÆ. Calyx divided, unequal. Corolla bilabiate. Stamens usually 4, didynamous sometimes but 2. Style 1; stigma simple or 2-lobed.

Fruit a superior 2 celled capsule, except Buchnera with central placentæ.—Seeds numerous. Herbaceous plants, with opposite, or alternate leaves.
Genera. Veronica p. 213. Buchnera 213. Schrophularia p. 213. Antirrhinum p. 214. Mimulus p. 214. Lindernia p. 214. Schwalbea p. 214. Chelone 215. Pedicularis p. 326. Pentstemon p. 215. Herpestis p. 215 Gratiola App. Gerardia p. 216. Seymeria p. 217. Euchroma p. 326. Melampyrum p. 327. Verbascum p. 232.

Order 84. Orobancheæ. Calyx 4-6-cleft. Corolla ringent. Stamens 4. didynamous. Ovary superior. Style 1. Stigma 2-lobed. Fruit a 1-celled, capsule. many seeded; placentæ in the middle of the valves. Herbaceous parasitic plants, with brown or corlorless foliage.
Genera. Orobanche p. 217. Epiphagus p. 218.

Sub-Class III. APETALÆ.

Flowers with a simple perianth, or without any floral envelope.

Division II. MONOCHLAMYDEOUS.

Flowers with a simple perinth.

(*a*) *Stamens perigynous.*

Order 129. Laurineæ. Flowers perfect, polygamous, or dioecious. Perianth inferior, 4-6-cleft. Stamens opposite the segments of the perianth, usually 9, the three inner ones sterile. Anthers adnate. Style simple. Fruit a 1 seeded drupe, shrubs or small trees. Leaves alternate. Flowers in panicles or umbels
Genus. Laurus p. 300.

Order 131. Santalaceæ. Calyx superior, 4 or 5-cleft, partly coloured—Stamens 4 or 5, opposite the segments, inserted into their bases. Style 1.—Stigma often lobed. Fruit drupaceous, 1 seeded. Trees or shrubs, or herbaceous plants. Flowers dioecious, polygamous and perfect.
Genera. Nyssa p. 301. Hamiltonia p. 302. Thesium p. 302.

Order 130. Thymeleæ. Calyx inferior, tubular, colored with the limb obsolete. Stamens 8, unequal. Style 1. Stigma simple. Fruit a 1 seeded, drupe.. Small shrub with tough bark. Leaves alternate entire.
Genus. Dirca p. 301.

Order 135. Urticaceæ. Flowers monœcious or dïœcious. Perianth membranaceous, lobed, persistent. Stamens definite, 4 or 5, inserted into the base of the perianth. Ovary superior, simple. Ovule solitary. Stigma simple. Fruit an indehiscent nut surrounded by the perianth. Usually herbaceous plants with alternate leaves, often covered with stings.
Genera. Urtica p. 308. Parietaria p. 309. Humulus p. 309. Bœhmeria p 309.

Order 136. Ulmaceæ. Flowers perfect or polygamous. Calyx divided, campanulate, inferior, irregular. Stamens 5–8. Ovary superior 2-celled, with solitary ovules. Stigmas 2, distinct. Fruit 1 or 2-celled, indehiscent. Seed solitary. Trees or shrubs, with scabrous, alternate, simple leaves.
Genera. Ulmus p. 310. Planera p. 310. Celtis p. 310.

Order 137. Artocarpeæ. Flowers monœcious or diœcious. Perianth usually divided, persistent. Stamens 4. Style 1 filiform. Stigma bifid. Fruit a fleshy receptacle covered by numerous nuts. Seed suspended, solitary. Leaves alternate. Trees or shrubs. *Genus.* Morus p 310.

Order 141. Amentaceæ. Flowers monœcious or diœcious. Sterile florets in aments, with scales. Stamens inserted into the scales; anthers 2-celled. Fertile florets aggregated, amentaceous, or solitary. Stigmas several. Fruit a drupe or a bony, membranaceous capsule. Albumen none. Trees or shrubs, with alternate leaves.

Sub-Order 1. SALICINEÆ. Flowers diœcious, achlamydeous. Stamens distinct, or monadelphous. Style 1, or absent. Stigmas 2. Fruit coriacceous, 1-2 celled, many seeded. Seeds comose.
Genera. Salix 312. Populus 313.

Sub-Order 2. MYRICEÆ. Flowers monœcious or diœcious achlamydeous. Stamens 6-8. anthers 2-4 celled. Ovary 1-celled, surrounded by several hypogynous scales. Stigmas 2. Fruit drupaceous.
Genera. Myrica p. 213. Comptonia 213.

Sub-Order 3. BETULINEÆ. Flowers monœcious, the sterile flowers sometimes with a lobed, membranaceous calyx. Stamens usually distinct. Ovary superior, 2-celled, but by abortion the fruit is but 1-celled. Stigmas 2 Seeds pendulous.
Genera. Betula 214. Alnus 214.

Sub-Order 4. CUPULIFERÆ. Flowers monœcious, amentaceous. Stamens 5-20, inserted into the base of the scales, or a membraceous calyx. Fertile florets; Ovaries crowned by the rudiments of a calyx; seated within a various formed involucre, stigmas several. Fruit a bony or coriaceous nut 1-celled, more or less inclosed in the involucre.
Genera. Carpinus p. 314. Ostrya p. 318. Quercus p. 315. Castanea 317. Corylus 317. Fagus 317.

Sub-Order 5. PLATANEÆ. Flowers monœcious achlamydeous. The fertile florets in heads. Stamens single; anthers linear, 2-celled Style 1, with the stigmatic surface on one side Nuts clavate. Seeds solitary, or in pairs pendulous. Catkins round pendulous. Large trees.
Genera. Platanus p 315. Liquidambar p. 315.

Order 134. EUPHORBIACEÆ. Flowers monœcious or diœcious. Calyx lobed, inferior, with various internal appendages. Sterile flowers; stamens few or numerous; anthers 2-celled. Fertile flowers; ovary superior sessile or stiped Fruit usually consisting of 3 dehiscent cells. Plants usually abounding with milky juice. Flowers axillary and terminal.
Genera. Pachysandra p 304. Croton p. 304. Crotonopsis p. 305. Borya p. 305. Tragia p. 305. Stillingia p. 305. Phyllanthus p. 306. Jatropha p. 306. Acalypha p. 306. Euphorbia p. 307.

Order 126. CHENOPODEÆ. Perianth deeply divided, persistent, sometimes tubular at the base. Stamens inserted into the base of the calyx, 1-5, opposite the segments. Ovary single with 1 ovule attached to the base of the cavity. Style usually divided Fruit membranaceous or baccate, not valvular. Herbaceous plants, with small flowers.
Genera. Chenopodium p. 296. Salsola p. 296. Atriplex p. 296. Acnida p. 297. Salicorna p. 297.

Order 127. PHYTOLACCEÆ. Perianth 5-parted, petaloid. Stamens 10. Style 5-10. Ovary 10-celled, with an ovule in each cell. Fruit indehiscent, with the seed solitary, ascending. Herbacious plants with alternate leaves.
Poke weed.
Genera. Phytolacca p. 298.

Order 128. POLYGONEÆ. Perianth divided, inferior. Stamens 5-9, inserted into the bottom of the calyx. Ovary superior with a simple erect ovule. Nut usually triangular. Herbaceous plants with alternate leaves; stipules surrounding the stem forming an ochrea.
Genera. Polygonum p. 298. RUMEX p. 299. Eriogonum p. 300.

(*a*) *Stamens hypogynous.*

Order 142. JUGLANDEÆ. Flowers monœcious. Sterile florets in an ament Perianth oblique membranaceous, scaly, irregularly lobed. Stamens hypogynous 3-36, with short filaments. Fertile florets 4-5 parted. Styles 1-2 or wanting Stigmas 2. lacerated or discoid, 4 lobed. Trees with alternate, pinnate leaves. Walnut Butter-nut Hickory.
Genera. Juglans p. 318. Carya p. 318.

Order 125. AMARANTHACEÆ. Flowers monœcious, diœcious or perfect.

Perianth 2-5-leaved, hypogynous, persistent scarious: Stamens 3–5 or numerous, hypogynous. Ovary single, superior, 1-celled, with 1-ovule, styles 1–3. Seeds pendulous. Herbaceous plants with simple leaves without stipules.
Genera. Amaranthus p. 295 and 322. Oplotheca 313. Iresine 323. Achyranthes 323.

Order 124. NYCTAGINEÆ. Calyx tubular, somewhat curved, contracted in the middle, limb entire or toothed. Stamens definite, 2–4 hypogynous. Ovary superior with a single erect ovule. Style 1. Fruit a utricle, inclosed in the calyx. Herbaceous plants, with opposite and usually unequal leaves. Flowers axillary or terminal, clustered or solitary.
Genera. Allionia p. 295. Bœrhaavia p. 295.

(c) *Stamens epigynous.*

Order 132. ARISTOLOCHIÆ. Flowers perfect. Perianth superior tubular, 3–4-cleft, regular or unequal. Stamens 6–19, epigynous distinct or adhering to the style and stigmas. Ovary inferior 3–6-celled ovules numerous; style simple, stigmas radiating. Herbaceous plants and shrubs, the latter usually climbing. Flowers axillary, solitary of a dull color.
Genera. Aristolochia p. 303. Asarum p. 303.

DIVISION III. ACHLAMYDEÆ.

Sub-Order MYRICEÆ
Sub-Order SALICINEÆ
Sub-Order BETULINEÆ
Sub-Order PLATANEÆ
} See Amentaceæ p. xiv.

Order 139. CALLITRICHINEÆ. Flowers monœcious, naked with 2 fistular colored bracts, Stamens 1. Anthers reniform, 1 celled. Ovary solitary, 4 cornered, 4 celled. Styles 2, subulate. Fruit 4 celled, 4 seeded, indehiscent—Seeds peltate. Aquatic, herbaceous plants, with minute, axillary and solitary flowers. *Genus.* Callitriche p. 311.

Order 138. PODOSTEMEÆ. Flowers naked, perfect. Stamens hypogynous, 2 or more, distinct, or monadelphous. Anthers oblong, 2 celled. Ovary 2 or 3 celled, with many ovules. Stigmas 2, sessile. Herbaceous, floating plants with capillary leaves. Flowers axillary or terminal, solitary, minute.
Genus. Podostemon p. 311.

Order 140. SAURUREÆ. Flowers naked, perfect, seated upon a scale Stamens 6, hypogynous, clavate, persistent. Anthers cuneate. Ovaries 4, distinct, each with a single ovule and a recurved stigma, Herbaceous plants, growing in marshy places. Leaves alternate, stipulate. Flowers in spikes.
Genus. Saururus p. 312.

Order 95. CONIFEREÆ. Flowers monœcious, or diœcious. Sterile Flowers monandrous, or monadelphous, collected in a catkin. Anthers 2, or many lobed, bursting outwardly. Fertile flowers usually in strobiles or cones, sometimes solitary. Ovary none, or open, resembling a scale, destitute of style or stigma. Ovules naked. Fruit a naked seed. Trees or shrubs abounding in resin. Leaves with parallel veins.
Genera. Juniperus p. 232. Cupressus p. 232. Pinus p. 233. Thuya p. 234.

CLASS II. ENDOGENEÆ, OR MONOCOTYLEDONEÆ.

Trunk usually cylindrical, with no distinction of bark, wood and pith. Leaves with simple parallel veins, not reticulated, usually alternate.

SUB-CLASS I. PETALOIDEÆ.

Stamens and pistils naked, or enclosed in a regular perianth.

A. TRIPETALÆ.

Calyx and Corolla distinct. Petals 3.

Order 96. ALISMACEÆ. Flowers monœcious, or perfect. Sepals 3. Petals 3. Stamens 6, or numerous. Ovaries superior, numerous. Styles several Aquatic plants, with parallel veined leaves, and white flowers.
Genera. Sagittaria p. 235. Alisma p. 235.

Order 97. HYDROCHARIDEÆ. Flowers monœcious, or dicœcious. Sepals 3 Stamens 2 epigynous. Ovary solitary, 1-celled, with numerous ovules. Floating plants. Flowers spathaceous, white or tinged with purple.
Genera. Hydrocharis p. 236. Valisneria p. 236.

Order 98. COMMELINEÆ. Sepals 3, distinct. Petals 3, sometimes united. Stamens 6, hypogynous, sometimes 3 of them abortive. Style 1. Capsule 3-celled many seeded. Herbaceous plants. Flowers blue, purple or rose color.
Genera. Commelina p. 236. Tradescantia p. 237.

Order 99. XYRIDEÆ. Sepals 3, glumaceous. Petals 3, unguiculate. Stamens 6, three of them fertile and inserted into the base of the petal. Style 3-cleft. Capsule 1-celled, many seeded, with parietal placentæ. Herbaceous plants with radical, ensiform leaves. Flowers in terminal heads, yellow.
Genus. Xyris p. 237.

ORDER 100. BROMELIACEÆ. Calyx tubular, persistent Petals 3. Stamens 6 Style 1. Capsule 3 celled, many seeded. Plants usually without stems, either hanging from the branches of trees, or with a tall scape, and fleshy radical leaves. Flowers purple or greenish white.
Genus. Tillandsia p. 238.

B. HEXAPETALÆ.

Sepals and petals confounded, usually 6, *colored.*

(*a*) *Perianth superior.*

Order 101. HYPOXIDEÆ. Perianth petaloid, superior, 6 parted. Stamens 6 Style 1. Stigmas 3-lobed. Capsule inferior, 3-celled, many seeded. Herbaceous plants with grass-like leaves and yellow flowers.
Genus. Hypoxis p 239.

Order 102. BURMANNIACEÆ. Perianth 6-parted, tubular, superior, with the 3 alternate segments small. Stamens 3. Style 1. Stigma 3-lobed, petaloid Capsule inferior, 3-celled, many seeded. Herbaceous plants, with minute, subulate, tufted, radical leaves, and blue or white flowers.
Genus. Burmannia p. 239.

Order 103. HÆMODORACEÆ. Perianth petaloid, superior, more or less woolly. Stamens 3-6, arising from the perianth. Style 1, simple. Capsule 3-celled, many seeded. Herbaceous plants, with equitant leaves, and showy, yellow flowers.
Genera. Lachnanthes p. 239. Conostylis p. 240.

Order 104. AMARYLLIDEÆ. Perianth superior, regular, the outer segments overlapping the inner. Stamens 6 arising from the perianth. Style 1. Stigma 3-lobed. Capsule 3-valved, 3-celled, many seeded. Herbaceous plants with ensiform leaves. Flowers white or tinged with red.
Genera; Amaryllis p. 240. Pancratium p. 240.

Order 105. IRIDEÆ. Perianth with the divisions partly cohering or separate, irregular, the outer ones largest. Stamens 3, arising from the base of the outer segments, free or monadelphous. Style 1. Stigmas 3; in the *Iris* petaloid Capsule 3-valved, 3-celled, many seeded. Herbaceous plants with equitant leaves. Flowers with spathes, mostly blue.
Genera. Iris p. 241. Sisyrinchium p. 241.

Order 106 ORCHIDEÆ. Perianth superior, ringent. Sepals 3, colored, the odd one uppermost. Petals 3, with the odd one lowermost, often lobed and

different from the rest, and usually spurred at the base. Stamens 3, united into a central column, gynandrous. Capsule 3-valved, inferior, many seeded Herbaceous plants with simple entire leaves.

Genera. Goodyera p. 242. Neottia p. 242. Listera p. 242. Cranichis p. 242. Pogonia p. 243. Callopogon p. 243. Corallorhiza p. 233. Arethusa p. 244. Triphora p. 244. Orchis p. 244. Habenaria p. 245. Tipularia p. 246. Epidendrum 246. Bletia p. 246. Malaxis p. 246. Cypripedium 247.

Order 107. MARANTACEÆ. Sepals 3, superior, short. Corolla tubular, irregular, with the segments in two whorls; the outer 3 parted, nearly equal; the inner very irregular. Stamens 3, petaloid, one only being fertile. Style petaloid or swollen. Fruit a 2-3-celled capsule. Herbaceous plants, with simple sheathing leaves, and yellow or purple flowers.

Genera. Canna p. 247. Thalia p. 248.

Order 113. DIOSCOREÆ. Flowers diœcious. Perianth superior, 6-cleft, equal Stamens 6, inserted into the base of the perianth. Style deeply 3-parted Fruit a thin compressed capsule. Twining plants, with reticulately veined leaves. Flowers small.

Genus. Dioscorea 256.

(*b*) *Perianth inferior.*

Order 108. JUNCEÆ. Perianth 6-parted, more or less glumaceoes. Stamens 6. Styles 1. Stigmas generally 3. Capsule 3-celled, 3-valved, many seeded Herbaceous, grass-like plants, with fistular, or flat channeled leaves. Flowers yellowish, brown or green.

Genera. Juncus p. 248. Pleea p. 249. This last genus belongs to the succeeding order.

Order 109. Melanthaceæ. Perianth 6-parted, petaloid, inferior. Stamens 6. Styles 3, or deeply 3-parted. Capsule divisible into 3 pieces. Herbaceons plants, with the leaves sheathing at the base.

Genera. Melanthium p 249.. Tofielda p. 250. Helonias p. 250. Nolina p. 250. Veratrum 251. Zigadenus 251.

Order 110. PONTEDEREÆ. Perianth tubular, colored, 6-parted, more or less irregular, with a circinate æstivation. Stamens 3-6, unequal, perigynous Style 1. Stigma simple. Capsule 3-celled, 3-valved, many seeded. Aquatic or marsh plants, with leaves sheathing at the base. Flowers spathaceous blue or white.

Genera. Pontederia p. 251. Heteranthera p. 252. Syena 253. This Genus belongs under Commelineæ.

Order 111. ASPHODELEÆ. Perianth petaloid, 6-parted, regular. Stamens 6, often unlike. Style 1. Fruit usually a 3-celled capsule, with loculicidal dehiscence. Seeds black with a crustaceous testa. Herbaceous plants with simple, and usually linear leaves

Genera. Ornithogalum p. 252. Allium p. 252. Aletris p. 253.

Order 112. SMILACEÆ. Flowers diœcious, or perfect. Perianth petaloid, 4-6-parted. Stamens 4-6, inserted into the base of the perianth. Style usually 3-parted. Fruit baccate. Herbs or shrubs, and often climbing. Leaves sometimes reticulated. Flowers inconspicuous.

Genera. Smilax p, 253. Convalaria p. 254. Streptopus 255. Medeola p. 255 Trillium p. 255. Uvularia p. 256. Polygonatum p. 325. Smilacina p. 326.

Order 114. LILIACEÆ. Perianth colored, regular, deeply 6 parted. Stamens 6 perigynous, opposite the segments. Style 1. Fruit capsular, 3-celled, 3-valved, many seeded, with loculicidal dehiscence. Seeds in 1 or 2 rows Herbaceous plants, generally with scaly bulbs. Flowers white red or yellow

Genera. Lilium p. 257. Yucca p. 257. Erythronium 258.

Order 115. PALMÆ. Flowers perfect, or polygamous. Perianth 6-parted, in two series. Stamens 6, opposite the segments of the perianth. Fruit a drupe or berry, 1-3-seeded. Herbaceous plants or trees, with fan-like leaves

Genera. Sabal p. 253. Chamerops p. 258.

Order 116. RESTIACEÆ. Flowers monœcious. Perianth 4-parted, the 2 in-

terior segments cohering. Stamens 4–6, attached to the base of the perianth Fruit capsular. Herbaceous plants, growing in wet soils, with the stems often naked, or covered with split sheaths. Leaves when present linear. Flowers in heads, very small.

Genus. Eriocaulon p. 259.

Order 117. TYPHACEÆ. Flowers monœcious, arranged on a naked spadix Perianth 3-leaved. Stamens 2–6, with long filaments. Fruit dry, indehiscent, 1-celled, 1-seeded. Herbaceous plants, growing in ditches and marshes, with ensiform leaves. Flowers without a spathe.

Genera. Sparganium p. 260. Typha p. 260.

Order 118. AROIDEÆ. Flowers monœcious or perfect, arranged on a spadix. Perianth none, or 4–6 parted. Stamens hypogynous, very short. Ovary superior, 1 celled, or very rarely 3-celled. Stigma sessile. Herbaceous plants, generally with tuberous roots. Leaves sheathing at the base, with parallel veins. Growing in wet places.

Genera. Acorus p. 260. Orontium p. 260. Arum 261. Caladium 261.

Order 119. FLUVIALERS. Flowers monœcious or perfect. Perianth 2–4 parted. Stamens definite, hypogynous. Stigma simple. Fruit dry, indehiscent 1-celled, 1-seeded. Herbaceous, water plants, with cellular leaves.—Flowers usually in terminal spikes, sometimes solitary.

Genera. Zostera p. 262. Caulinia 262. Ruppia 262. Potamogeton 262.

Order 120. JUNCAGINEÆ. Flowers perfect. Perianth 6-leaved. Stamens 3–6, hypogynous. Stigmas 3. Fruit 3–4 united capsules, opening at the base Herbaceous bog plants, with ensiform leaves. Flowers in spikes or racems.

Genus. Triglochin p. 263.

Order 121. PISTIACEÆ. Flowers 2, enclosed in a spathe. Stamens 2–7. Style 1, short. Fruit indehiscent 1, or more seeded. Floating plants, with cellular, lenticular or lobed stems and leaves.

Genera. Limna 263. Pistia 263.

SUB-CLASS III. GLUMACEÆ.

Flowers destitute of a true perianth ; the floral envelopes, consisting of imbricated bracts, which are alternate instead of verticillate.

Order 122. GRAMINEÆ. Flowers usually perfect, sometimes monœcious or polygamous. Glumes usually 2, alternate, generally unequal, sometimes single. Paleæ 2, alternate. Stamens hypogynous, 1–6. Anthers versatile. Styles 2, occasionally 1 or 3. Culms cylindric, with a silecious crust. Leaves alternate, with a split sheath. Flowers in small spikes, the spikes arranged in racemes or panicles.

Tribe 1. Agrostideæ. *Genera.* Agrostis p. 264. Trichodium p. 265. Muhlenbergia p. 266. Alopecurus p. 266. Phleum p. 266. Phaleris p. 266.

Tribe 2. Paniceæ. *Genera.* Panicum p. 267. Digitaria p. 270. Paspalum p. 270. Ceresia p. 271. Aulaxanthus p. 271. Cenchrus p. 271. Tripsacum p. 272.

Trice 3. Stipaceæ. *Genus.* Stipa p. 272.

Tribe 4. Bromeæ. *Genera.* Aristida p. 272. Calamagrostis p. 273. Anthoxanthum p. 273. Aira p 237. Avena p. 274. Arundo p. 274. Festuca p. 275. Ceratochloa p. 275. Dactylis p. 275. Bromus p. 276. Poa p. 276. Uniola p. 277. Briza p. 278. Melica p. 278.

Tribe 5. Chlorideæ. *Genera.* Cynodon p. 278. Chloris p. 279. Monocera p. 279. Eleusine p. 279.

Tribe 6. Cerealiæ. *Genera.* Elymus p. 280. Rottbollia p. 280. Spartina 280.

Tribe 7. Saccharineæ. *Genera.* Andropogon p. 280. Gymnopogon p. 281. Erianthus p. 281.

Tribe 8. Oryzeæ. *Genera.* Leersia p. 282. Zizania p. 282.

Tribe 9. Bambusaceæ. *Genus.* Arundinaria p. 283.

Order 123 Cyperaceæ. Flowers perfect or monœcious, consisting of imbricated solitary bracts. Stamens hypogynous, 1–12. Anthers fixed by their base. Style 1, divided. Stems usually angular. Leaves with the sheaths entire

Genera. Cyperus p. 283. Dulichium p. 284. Mariscus p. 324. Kyllingia p. 285. Scirpus 285. Eriophorum p. 287. Schœnus p. 287. Dichromena p. 287. Rhyncospora p. 288. Fuerina p. 288. Schleria p. 289. Carex p. 290.

PART II.

DESCRIPTIVE BOTANY.

Class. I. EXOGENS or DICOTYLODONS.

Trunk consisting of bark, wood, and pith distinct, more or less conical, increasing by an annual deposite of new wood and cortical substance between the wood and bark. *Leaves* attached to the stem by articulation, their veins, and those of the floral envelops reticulated. *Embryo* with two or more opposite cotylodons. Seeds anatropous.

(The student will readily distinguish the plants of this class by the reticulated veins of the leaves, sepals and petals; by the presence of bark and pith. It includes all our shrubs and forest trees.)

Subclass I. POLYPETALAE.

Flowers generally dichlamydeous. *Calyx* consisting of several distinct sepals. *Petals* several, distinct, hypogynous, rarely uniting, sometimes wanting.

Order I. RANUNCULACEÆ. (*Crow-foot tribe.*)

Sepals 3 to 6, usually 5, deciduous. æstivation imbricate (except clematis, which is valvate). *Petals* 3 to 15. *Anthers* adnate. *Carpels* numerous, or united into a single pistil. *Seeds* anatropous, erect or pendulous. *Embryo* minute. *Albumen* large, corneous. *Plants* generally with acrid, transparent juice.

Genus I. CLEMATIS.

Coral none. *Calyx* 4 to 6 leaved, colored. *Anthers* linear, extrorse. *Fruit* an achenium, with long plumose tails, except in Crispa.

1. C. *Virginiana.* Climbing, covering small trees and bushes with its foliage. *Stem* terete, pubescent when young. *Leaves* ternate, leaflets cordate-ovate, acute, coarsely toothed or lobed; veins and margins pubescent. *Flowers* panicled, dicœcious. *Sepals* 4, oval, pubescent, fragrant. *Carpels* with long plumose tails.

White. ♄. Aug. Can. to Flor. Fertile soil. *Virgin's bower.*

2. C. *Catesbeyana.* *Stem* climbing, pubescent, similar to the preceding species. *Leaves* ternate; leaflets subcordate, 3-lobed, lobes entire, acuminate. *Panicle* divaricate, dichotomous. *Flowers* small, the pistillate florets bearing abortive stamens. *Sepals* 4, oblong, downy on the outer surface.

White. ♄. July to Aug. So. Ca. and Geo.

3. C. *Holocericea.* Climbing, the whole plant silky. *Flowers* dicœcious in paniculate corymbs, trichotomous, few flowered. *Leaves* ternate, pubescent on both sides, leaflets oblong-lanceolate, entire. *Sepals* linear. Tails of the carpels long, feathered.

White. ♄. July to Aug. Geo.

4. C. *Cylindrica.* Climbing, pubescent. *Leaves* pinnate, membranaceous, decompound; leaflets ovate, accute at each end, glabrous, petiolate. Peduncles 1-flowered, terminal, solitary. *Flowers* cylindrical, nodding. *Sepals* coriaceous, acuminate, margin undulate. Tails of the seed plumose.

5. C. *Walteri* differs from the preceding in having the leaflets linear-lanceolate.

Bluish purple. ♄. July. Car. and Geo.

6. C. *Linearloba.* *Stem* terete, slender, glabrous. *Leaves* pinnate, 3–4 pair, smooth, leaflets entire or 3-parted, lobes linear. Peduncles 1-flowered, terminal, solitary. *Sepals* acute, pubescent along the margins, twice as long as the stamens.

Perhaps the above is a variety of Cylindrica.

7. C. *Viorna.* *Stem* climbing. *Leaves* glabrous, pinnately divided, segments oval, lanceolate, entire or 3-lobed. Floral leaves entire. *Peduncles* 1 flowered, occasionally 2 or 3-flowered. *Sepals* coriaceous about one inch long, flowers nodding.

Purple. ♄. Penn. to Geo.

8. C. *Reticulata* climbing. *Leaves* coriaceous, glabrous, pinnate, leaflets three or four pairs, petiolate, entire or variously lobed, sometimes obtuse, at other times acute and mucronate, strongly veined on both sides. *Carpels* with plumose tails.

Dull purple. ♄. Middle Car. and Geo. May to Aug.

9. C. *Crispa.* *Stem* climbing, pubescent. *Leaves* pinnate ternate, or 3-lobed, generally glabrous. *Flowers* solitary, on the summit of small branches, campanulate. *Sepals* coriaceous, rugose, the apex reflexed, margin crisped. *Stamens* very numerous, half the length of the sepals. *Carpels* numerous tormentose with short tails.

Purple. ♄. Low country. May.

10. C. *Ochroleuca.* *Stem* erect, simple, pubescent. *Leaves* simple, ovate, entire, when young pubescent, on short petioles. *Flowers* solitary, terminal, pedunculate, inclined. *Sepals* silky on the outside.

Yellowish. ♃. Mountains. 12 in.

11. C. *Ovata.* *Stem* erect, simple. *Leaves* broad ovate, glabrous, on short petioles, lower ones subcordate. *Flowers* terminal, solitary. Tails of the seed very long.

Purple. ♃. Mountains.

12. C. *Baldwinii.* Stem erect, somewhat branching, slender, slightly pubescent. *Leaves* varying from oblong to linear-lanceolate, entire, or 3-cleft, or lobed, the lobes linear often lacineate. *Peduncle* terminal, elongated, 1-flowered. *Flower* cylindrical—campanulate. *Sepals* wooly on the margin. *Carpels* with very long plumose tails. (Torrey & Gray.)

Purplish. 12 to 18 in. Florida.

Remarks.—The above genus contains no plants used for any other purpose an or-

nament. Some of them secrete an exceedingly acrid juice, which produces blisters, and the C. erecta and flammula are used, it is said, by the beggars on the continent of Europe for the production of ulcers, to excite the compassion of the public.

Genus II. THALICTRUM.

Sepals 4 or 5. *Petals* none. *Stamens* numerous, very long. *Anthers* innate. *Carpels* 4 to 15, without tails, striate. *Flowers* in corymbs or panicles. Often dioecious or polygamous.

1. *T. Cornuti.* *Stem* slender, erect, glabrous. *Leaves* ternately decompound. Leaflets roundish obovate or elliptical, 3-lobed or entire, glaucous beneath, slightly rugose on the upper surface, margin revolute when old. (The leaves of this species vary from the common type in almost every respect.) *Panicle* terminal, compound. *Sepals* oblong, small. *Filaments* clavate. *Anthers* oblong, pointed. *Carpels* glabrous.
White. ♄. Can. to Geo. June to August.

2. *T. Dioicum.* *Stem* herbaceous, glabrous. *Leaves* generally triternate on short petioles, leaflets roundish, crenately and obtusely lobed, glaucous beneath. *Flowers* dioecious, filaments filiform, anthers linear, mucronate. *Carpels* strongly striate, sessile, oblong.]
Var. *Stipitatum.* Carpels stipitate. *Meadow rue.*
White. ♄. May to July. Mountains.

3. *T. Anemonoides.* *Stem* 6 to 10 inches high, in bunches. *Leaves* radical and cauline, radical ones on long petioles, biternate, cauline ones verticilate, trifoliate, sessile, leaflets roundish, petiolate, obtusely 3 to 5-lobed. *Sepals* 6 to 10, elliptical. *Ovaries* 6–10, stigma sessile, simple.
White. 4 to 8 in. Mar. Ap. Mountains. *Rue anemone.*

Remarks.—The Thalictrums are easy of cultivation, and quite ornamental, from their bright green and decompound leaves and delicate flowers. They possess, in a slight degree, the acrid properties characteristic of the order, but are applied to no use except nament.

Genus III. ANEMONE.

Involucres 3-leaved, variously divided, remote from the flower. *Sepals* petaloid, 5 to 15. *Petals* none. *Carpels* numerous, mucronate. *Herbs*, perennial, with radical leaves.

1. A. Caroliniana. Scape 10 to 16 inches high, pubescent, particularly towards the summit. *Leaves* ternate, leaflets notched and serrated. Involucrum 3 leaved near the middle of the scape, leaflets 3-cleft, sessile. *Sepals* 16 to 20, the exterior oblong, oval, thick, and sprinkled with purple specks, the inner thin, petal-like, and sometimes almost linear. *Carpels* in an oblong cylindrical head, covered with a silky down.
White. ♄. March. Geo. and Car. 18 in.

2. A. Nemorosa. *Stem* 8 to 12 inches high. *Leaves* ternate, leaflets lobed, toothed, acute, 1-flowered, corolla 5 or 6 petaled, seeds ovate, with a short hooked point. 6–8 in.
White, tinged with purple. March. Geo. and Car. *Wood Anemone.*

3. A. Virginiana. *Stem* 2 to 3 feet high, simple, pubescent. *Leaves* ternate, rugose, hairy, segments 3-cleft, acuminate, serrate. Involucre similar, petiolate. *Sepals* 5, pubescent on the outer surface, coriaceous, the 2 exterior green, lanceolate, acute, the interior elliptical. *Carpels* in an oblong ovate capitulum, woolly. *Peduncles* one-flowered, 3 to 4 from each involucrum.
Yellowish green. ♄. Car. and Geo. July to August. 18 in.
Wild flower. Thimble weed.

Remarks.—Many beautiful foreign species of this genus are cultivated, which are

very showy, varying in color through the series from blue to red, but of our own species, no care has been taken for their improvement by cultivation, which would richly repay the Florist's care.

Genus IV. HEPATICA.

Involucrum 3-leaved, resembling a calyx, near the flower. *Sepals* petaloid 6 to 9, arranged in 2 or 3 rows. *Petals* none. *Achenia* numerous, without tails.

1. H. Triloba. *Leaves* cordate, 3-lobed, entire, thick, coriaceous. *Scape*, petioles and involucrum villous.
Rose colored. ♄. Common. Feb. *Liverwort.* 5 in.

Remarks.—This plant has enjoyed great celebrity, both in this country and Europe. It has been deemed almost a specific in hepatic or liver affections, and, not many years since, was highly extolled as a certain cure for chronic coughs. It is a mild tonic and astringent, and may be taken in any quantities, by infusion in water.

Genus V. HYDRASTIS.

Sepals 3, ovate, petaloid. *Petals* none. *Stamens* and ovaries numerous. *Carpels* berry-like, in a globose head; 1, and rarely 2-seeded.

1. H. Canadensis. *Root* yellow and bitter. *Stem* simple, 2-leaved. *Leaves* alternate, cordate, palmate, acutely serrate, lower leaf petioled, upper subsessile, glabrous. *Flowers* solitary, terminal.
Rose color. ♃. Mountains. April, May. 6–8 in.
Orange root. Turmeric root.

Genus VI. RANUNCULUS.

Sepals 5. *Petals* 5, with a scale on the inside of the base of the petals. *Stamens* generally numerous. *Achenia* ovate, pointed, compressed, smooth, striated or tuberculated, arranged in a cylindric or globose head.

1. R. Aquatilis. *Stem* floating, long, slender, jointed. *Leaves* submersed, capillary, alternate, petioled. *Calyx* glabrous. *Petals* white, claw yellow, with a conspicuous pore. *Achenia* transversely wrinkled.
♄. June to Aug. Ponds and streams. Car. and Ga.

(*a.*) *Leaves undivided, flowers yellow, carpels smooth.*

2. R. Laxicaulis. *Stem* weak, much branched, declined, rooting at the lower joints, glabrous. *Leaves* smooth, linear, lanceolate or eliptical, oblong, upper ones linear; peduncles opposite the leaves, 1 to 2 inches long. *Carpels* with a subulate beak, in a globular head. *Petals* much longer than the calyx, slender at the base.
♄. Ditches. Car. and Geo. July.

3. R. Pusillus. *Stem* decumbent, little branched, glabrous. *Leaves* on long petioles, entire or denticulate, obtuse, lower ones ovate or subcordate, upper ones linear lanceolate. *Peduncles* opposite the leaves, one flowered. *Sepals* ovate, obtuse. *Flowers* small. *Petals* small, nearly round. *Pore* at the base of the limb of the petal. *Stamens* few. *Styles* none. *Achinia* ovate.
Yellow. ♄. Very common in wet soils. March.

(*b.*) *Leaves divided.*

4. R. Abortivus. *Stem* glabrous, simple or branching. Radical leaves

on petioles, cordate, reniform, or broadly ovate, sometimes 3-parted, crenate. Cauline ones 3 to 5 parted, with long, entire, linear lobes. *Sepals* glabrous, reflexed, longer than the petals. *Flowers* small, scale large. *Carpels* in a globose head.

½. Common in the middle regions of Geo. and Car. May.

5. R. Sceleratus. *Root* fibrous. *Stem* 1 to 2 feet high, fistulous, thick, leafy. *Leaves* on petioles, lower ones with petioles 4 or 5 inches long, sheathing, 3-parted, radical ones with the divisions 3-lobed and obtusely incised, upper ones with oblong linear entire lobes. *Sepals* reflexed, colored. *Flowers* small, solitary, generally opposite the leaf; petals longer than the sepals, shining. *Stamens* 12 to 15, shorter than the petals. *Carpels* small, numerous, in a cylindrical head.

½. Common in the low country. May.

6. R. Pursh. Submerged leaves, filiformly 2 or 3-chotimously dissected, with segments flat; emersed ones reniform, 3 to 5 parted, the lobes variously divided. *Petals* twice as large as the reflexed sepals. *Carpels* in globose heads, smooth, with a short and straight ensiform style.

In ponds and muddy places. N. Car. and Lou. Torrey and Gray.

7. R. Repens. *Stems* prostrate and creeping, sometimes erect. *Leaves* trifoliate, segments cuneate, 3-lobed, incisely toothed, middle one petioled. *Calyx* spreading. *Carpels* with a straight point. This plant is very variable: sometimes villose, at others glabrous. *Flowers* vary in size, and number of petals, from 5 to 8. The R. Nitidus of Elliott, I believe, is only a variety of this, as I have seen it assuming all the peculiarities of that plant, with good reason to believe it was the one described.

In wet grounds, very common in Middle Geo.

8. R. Palmatus Carolinianus. *Stem* erect, 12 to 18 inches high, hairy, hair above appressed, below spreading; branches long, 1-flowered. *Leaves* all petioled, radical ones palmately 3-parted, lobes toothed, the upper 2-cleft, with the lobes nearly entire, linear-lanceolate. *Flowers* opposite the leaves, on long slender peduncles. *Carpels* compressed, margined, with beak broad, nearly straight.

May. Swamps. Car. and Geo.

9. R. Hispidus. *Stem* erect, branching 12 to 18 inches high. *Leaves* 3-cleft or 3-parted, segments oval, acute, toothed. *Petioles* covered with dense expanding hair. Radicle leaves, with segments generally separate, hairy. *Flowers* generally on long peduncles, covered with appressed hair. *Petals* much larger than the calyx, obovate. *Carpels* with a short straight point.

Rich, shaded soil. May to June.

10. R. Reservatus. *Stem* erect, 12 to 18 inches high, clothed with spreading hairs. *Leaves* 3-parted, but not to the base, villous, sometimes nearly glabrous, hair appressed, segments broad, ovate, acutely serrate, lateral ones, 2-lobed. *Flowers* small, on long peduncles, calyx reflexed, petals narrow-oblong, smaller than the sepals. *Carpels* in a globose head, with a hooked point.

Woods. July.

11. R. Pennsylvanicus. *Stem* erect, strong, branching, 1 to 2 feet high, hispid, with stiff spreading hairs. *Leaves* ternate, villous, hairs appressed, petioles covered like the stem, lower ones on long petioles, leaflets petiolate, lanceolate, incised. *Flowers* small, calyx reflexed, sepals much larger than the petals. *Carpels* compressed in an ovate head, smooth, with a sharp point.

July. In the upper districts of Geo. and Car.

12. R. Tomentosus. *Stem* short, ascending at the summit, covered with dense soft expanding hair, 1 or 2-flowered. *Leaves* 3-parted, segments 3-lobed, ovate, dentate, tomentose, hair appressed, upper leaves sessile, ovate entire. *Petals* obovate. *Sepals* villous, nearly as large as the petals.

Upper districts of Car. and Geo.

C. Carpels tubercled or prickly.

13. R. Muricatus. *Stem* erect or procumbent, 12 to 18 in. high, branch-

ing, succulent, pilose. *Leaves* glabrous, petioled, sometimes entire, sometimes 3-cleft even to the base, lobes toothed, floral ones oblong or lanceolate, entire, lower ones slightly cordate, shining, toothed. *Peduncles* opposite the leaves, about 1 inch long. *Petals* obovate, longer than the calyx. *Sepals* reflected, lanceolate. *Carpels* with a thick margin, tuberculate, aculeate, with a straight or slightly hooked beak.

☺. In cultivated land. March to May.

14. R. Parviflorus. *Stem* erect or slightly decumbent, 12 to 15 inches high, slender, villous. *Leaves* orbicular, 3-lobed or ternate, notched, pubescent. *Peduncles* opposite the leaves, short. *Flowers* small. *Petals* 3 to 5, equal to the sepals. *Sepals* reflexed. *Carpels* with thin margin, tubercled, with a hooked point.

May.

Remarks.—The Ranunculi are distinguished for an exceedingly acrid juice, which is so volatile that drying or infusion in water, renders plants, which otherwise act as a powerful epispastics, perfectly inert. Some of these plants have been used for drawing blisters, and for the want of the Spanish flies, may be used with advantage, although, from their powerful action, should be used with care. The R. Sceleratus will produce a blister in an hour and a half.

Genus VII. CALTHA.

Calyx colored. *Sepals* 6 to 9, resembling petals. *Petals* none. *Stamens* numerous. *Follicles* numerous, compressed, many-seeded.

1. C. Ficarioides. *Stem* erect, 1-flowered, 1-leaved, radical. *Leaves* petioled, cordate-ovate, obtuse, sparingly toothed, many nerved. *Sepals* eliptic.

Yellow. ♄. 8 to 12 in. Swamps. *Cowslip.*

Remarks.—The Caltha possesses the same acrid properties as the Ranunculus, but by boiling is rendered harmless, and is prepared for food in early Spring.

Genus VIII. AQUILEGIA.

Sepals 5-deciduous, colored. *Petals* 5, somewhat bilabiate, each petal being produced into a spur, projecting between the sepals. *Capsules* 5, many-seeded, terminated by a style.

1. A. Canadensis. *Stem* 12 to 18 inches high. *Leaves* on long 3-cleft footstalks, ternate and biternate, leaflets lobed and crenate, glaucous. *Flowers* pendulous, spurs straight, stamens exsert, numerous, disposed in several parcels.

Scarlet, tinged with yellow. ♂. Mountains. May.

Remarks.—Aquilegia affords beautiful ornaments for the Flower gardens, and as such, several species are cultivated.

Genus IX. DELPHINUM.

Sepals 5, deciduous, irregular, petaloid, the upper one produced downward into a long spur. *Petals* 4, irregular, two upper ones horned. *Capsules* mostly 3, many-seeded. *Flowers* in terminal racemes.

1. D. Consolida. *Stem* erect, divaricately branched, glabrous. *Leaves* petiolate, palmately divided. *Flowers* few, in a loose raceme. *Pedicels* longer than the bracts. *Carpels* smooth.

Blue. N. Car. and Vir. Introduced.

2. D. Tricorni. *Root* tuberous. *Stem* 8 to 12 in. high, glabrous. *Leaves* 5-parted, with the divisions 3-5 cleft. *Petioles* slightly dilated at the base, 2 to 4 inches, glabrous, lobes linear, acute. *Flowers* in loose terminal racemes, large, 6 to 12-flowered, hairy on the outside. *Spur* straight, as long as the calyx. *Carpels* 3, ovate.

Blue. ♀. Mountains. May.

3. D. *Azureum*. *Stem* 3 to 5 feet high, pubescent. *Leaves* on short petioles, 3 to 5-parted, many cleft, segments linear, pubescent. *Flowers* in long racemes, on short peduncles, petals bearded at the apex, shorter than the sepals, lower ones deeply 2-cleft, claw hispid on one side, the other with a spur like process at its base.

Blue, large. ♄. Middle Geo. May

4. D. Exaltatum. *Stem* 2 to 4 feet high, pubescent towards the summit, branching. *Leaves* flat 3 to 5 cleft below the middle, lobes wedge-shaped, 3-cleft at the summit, acuminate. Lateral ones often 2-lobed. Racemes erect, petals pubescent, on the outer surface, the lower petals fringed. Spur straight, as long as the calyx.

Bright blue. ♄. Mountains.

5. D. Virescens. *Stem* 8 to 12 inches high, pubescent. *Leaves* 3 to 5-parted, the middle division generally entire, lateral lobes 2-3-cleft; lobes lanceolate, petioles slightly dilated. *Flowers* in a loose few-flowered raceme, slightly pubescent, pedicles longer than the flowers. *Sepals* oblong or lanceolate, marked with a spot near the apex, longer than the petal; lower petals deeply 2-cleft, densely bearded, capsules 3.

Flowers large, yellowish or greenish white. ♄. June.

6. D. Virginium. *Petioles* scarcely dilated at the base. *Leaves* flat, 3-parted, segments cuneiform, obtuse, 3-lobed, mucronate, uppermost ones linear, undivided or 3-parted, racemes loose, velvety, limbs of the interior petals bifid at the summit, spur straight, as long as the sepal, ovary silky—Torrey & Gray.

Azure. Texas.

Remarks.—A beautiful genus with every variety of hue through the blue series; much cultivated as a border flower. The D. consolida has been used in medicine. The flowers are bitter and acrid, and have been used in healing wounds. A tincture of an ounce of seeds in a pint of alcohol is said to be useful in asthma, and dropsy; ten drops a dose. The root possesses the same properties.

Genus X. ACONITUM.

Sepals petaloid, irregular, deciduous, upper one concave, shield-like. *Petals* 5, three lower ones minute, often wanting, the two upper on long claws, concealed under the upper sepal. *Follicles* 3 to 5, many-seeded.

1. A. Uncinatum. *Stem* twining, branching, slender, pubescent when young. *Leaves* 3 to 5-lobed, coriaceous, coarsely toothed, truncate at the base. *Lobes* 3-ribbed, lateral segments, often 2-lobed. *Flowers* in a loose panicle, galea large, tapering to an obtuse beak, spur thick, inclined.

Blue. ♃. Mountains. 2 ft. *Monk's Hood.*

Remarks.—The same powerful, volatile principle noticed under Ranunculus exists in the Aconitum in a state of much greater concentration. Another principle of a narcotic character is found in the different species of this genus called *Aconatin*. The leaves of the Aconitum act powerfully on the human system, producing in large doses the usual effects of the most violent poisons. In small doses of one or two grains of the powdered leaves, it has been employed in rheumatism, (in which it has produced most salutary effects) gout, scrofula, cancer, &c. It acts most powerfully on the nervous system, producing delirium in over doses. The A. uncinatum is cultivated as an ornament of the flower garden.

Genus XI. ACTÆA.

Sepals 4, deciduous. *Petals* spatulate, oblong, shorter than the stamens. *Stamens* numerous, anther introrse. *Stigma* sessile. *Carpels* baccate, solitary, many-seeded, *Seeds* compressed, smooth.

1. A. Alba. *Stem* 2 to 3 feet high. *Leaves* ternately decompound, leaflets acutely serrate, notched, slightly pubescent. Raceme oblong, pedicels very thick when the fruit is matured, flowers crowded. *Fruit* white.
Mountains. April. *Necklace weed.*

Genus XII. CIMICIFUGA.

Sepals 4–5. *Petals* 4, sometimes none, concave or unguculate. *Stamens* numerous. *Anthers* introrse. *Styles* short. *Leaves* 2 or 3, ternately divided. *Segment* incised, toothed. *Flowers* in long racemes.

1. C. Racemosa. *Stem* 3 to 8 feet high, generally pubescent, furrowed, leafy near the middle. *Leaves* decompound, incised, acutely serrate. Flowers monogynous, bracteate, in long terminal racemes, branched. *Sepals* caducous. *Petals* none, or very small with long claws. *Capsules* ovate, seeds 7 or 8, compressed.
Yellowish white. ♄. Thick woods. Mid. Geo.

Flowers Polygynous.

2. C. Americana. *Stem* 2 to 4 feet high, glabrous. *Leaves* decompound, triternate, segments ovate, the terminal 3-parted or 3-cleft, incisely lobed, cuneiform or subcordate at the base. *Flowers* in racemes, on short bracteate pedicels. *Sepals* 5, ovate. *Ovaries* 2 to 5, stipitate, smooth, compressed, generally fewer in the upper than in the lower flowers.
Mountains. Aug. and Sept.

3. C. Cordifolia. Resembles the two preceding. *Leaves*, biternate. *Leaflets* 3–5–7-lobed, cordate. *Ovaries* 2 to 3, glabrous, sessile.
Mountains. July.

Remarks.—The C. Racemosa has long been used in medicine; in families as a remedy for rheumatism, dropsy, hysteria and affections of the lungs; and by physicians with decided success in cases of chorea, St. Vitus' dance. The decoction of the root is the form in which it is usually administered.

Genus XIII. TRAUTVETTERIA.

Sepals 4 to 5. *Petals* none. *Stamens* numerous. *Anthers* introrse. *Capsules* 15 to 20, membranaceous and indehiscent, 3-carinate, 1-seeded, tipped with a very short hooked style, seed erect. Perenial herbs. *Leaves* palmately lobed. *Stem* simple, or branching above. *Inflorescence* cymose.

1. T. Palmata. *Leaves* slightly coriaceous with conspicuous reticulated veins. *Cymes* mostly compound. Torry & Gray.
Mountains, N. C. July and Aug. 2–3 feet.

Genus XIV. MYOSURUS.

Sepals 5, produced downward at the base beyond their in-

sertion. *Petals* 5, the claw filiform and tubular. *Stamens* generally numerous, 5–20. *Achenia* triquetrous, spicate, on an elongated torus. *Seeds* suspended.

1. M. *Minimus*. *Scape* 2–4 inches high. *Leaves* 1-2 inches long, very narrow, radical. *Flowers* minute. *Spikes* of carpels terete, tapering. Pale yellow. ○. Ap. Geo. and Lou. *Mouse-tail.*

Genus XV. ZANTHORHIZA.

Sepals 5. *Nectaries* 5, on pedicels. *Ovaries* 5–10, with 2–3 ovules. *Follicles* small, mostly 1-seeded, seed suspended.

1. Z. *Apiifolia*. A shrub. *Root* large, yellow and bitter. *Stem* simple, smooth and glabrous. *Leaves* triternate, crowded at the summit of the stem, leaflets incised, under surface pubescent, petioles 6–8 inches long. *Flowers* in racemes, axilary and compound, minute, often polygynous. Dark purple. ħ. Ap. Upper districts of Car. and Geo. 2–3 ft. *Yellow Root.*

Remarks.—The root of this plant is exceedingly bitter, and is used as a tonic. It is also used in coloring yellow. It possesses decided properties, and we doubt not might be applied to useful purposes.

Genus XVI. ADONIS.

Sepals 5. *Petals* 5–15, emarginate, concave, connivent, without the nectariferous pores. *Achenia* spicate, terminated by the short style. *Leaves* cauline, tripinnate, segments linear and numerous. *Flowers* solitary, on the extremity of the stem or branches.

1. A. *Autumnalis*. *Stem* branched, herbaceous. *Carpels* somewhat reticulate, collected into an ovate head. Bright scarlet. ☉. Aug. Lou. *Pheasant's eye.*

Remarks.—A beautiful plant of easy culture. Derives its name from the supposition, that it sprang from the blood of Adonis, when wounded by a Boar.

Order II. MAGNOLIACEÆ, (*Including Winteraceæ.*)

Sepals, 3 to 6, deciduous. *Petals* 3 to 30 hypogynous, in several rows; æstivation imbricate. *Stamens* numerous, hypogynous; anthers *adnate*, introrse, bursting by a longitudinal slit; filaments short. *Carpellæ*, few in a single row, or numerous in several rows. *Seeds* anatropous, suspended, or ascending. *Embryo* minute; albumens fleshy. *Leaves* alternate, entire, coriaceous, with caducous stipules, minutely punctate. *Flowers* generally large, and fragrant. *Trees* and *shrubs*.

Genus I. ILLICIUM.

Sepals petaloid, 3–6. *Petals* numerous, in three series. *Carpels* numerous arranged in a circle, follicular. *Seeds* shining. *Leaves*, when bruised, exhale the odor of anise. *Evergreen shrubs.*

1. I. *Floridanum*. *Leaves*, smooth, perennial, on short petioles, oblong.—

Flowers small, axillary, nodding; petals 6–12, ovate or roundish, concave.—*Stamens* short. *Carpels* arranged around a central receptacle. *Anise tree.*

Dull yellow. ♄. May. Flor. and lower districts of Geo. 6–10 feet.

2. I. *Floridanum.* *Leaves* accuminate. *Petals* 27–30, the exterior oblong, the interior ligulate. *Flowers* larger than the preceding.

Dark purple. ♄. May. Florida in swamps.

Remarks.—In this country, the Illiciums are used only as ornaments, but they are used in other countries as aromatics, and stimulants, and carminatives. In China, they are burnt in the temples. In Europe they are used in giving a peculiar flavor to certain liquors. They are easily propagated by layers.

Genus II. MAGNOLIA.

Sepals 3, caducous, sometimes wanting. *Petals* 6–12, caducous. *Carpels* 2-valved, 1-seeded, imbricate in their arrangement, forming an ovate strobile-like fruit. *Seeds* suspended. *Trees.*

1 M. *Grandiflora.* *Leaves* evergreen oval lanceolate, coriaceous, ferruginous underneath, 6–8 inches long, bunches somewhat whirled. *Petals* 9–12 obovate, abruptly unguiculate. *Stamens* numerous, imbricate. *Style* short, recurved. *Carpels* 1–2 seeded; seeds covered with a scarlet pulp. *Magnolia.*

White. ♃. June. Geo. to the Miss. A large tree.

2. M. *Glauca.* *Leaves* deciduous, alternate, acute, oval, glaucous underneath, pubescent when young, the upper surface shining. *Flowers* terminal, solitary, fragrant. *Sepals* membranous, as long as the petals. *Petals* 9–12 obovate, narrowed at the base. *Bay.*

White. ♃. Common in swamps. Small tree. April and May.

3. M. *Acuminata.* *Leaves* deciduous oval, acuminate, sometimes broad and lanceolate, pubescent beneath. *Petals* obovate, obtuse. *Fruit* cylindrical, 2–3 inches long. *Cucumber tree.*

Dull yellow, tinged with blue. ♃. June and July. Geo. 50–60 feet.

4. M. *Tripetala.* *Leaves* large, deciduous, cuneate, lanceolate, acute, silky when young, crowded at the extremity of the branches, 15–20 inches long, 6–8 wide. *Sepals* 3, reflexed. *Petals* 9 oval lanceolate, acute, odor of the flowers disagreeable. *Fruit* oval, red, 3–4 inches long. *Umbrella tree.*

White. ♃ May to June. Common. 30—40 feet.

5. M. *Cordata.* *Leaves* deciduous, broad-ovate, subcordate, acute, 4–6 inches long, slightly tormentose underneath. *Sepals* small. *Petals* oblong, acute 6–9. *Fruit* cylindric, 3–4 inches long. Bark furrowed.

Yellowish, faintly streaked with red. ♃. Mountains. May. 45–50 ft.

6. M. *Auriculata.* *Leaves* deciduous, spatulate-ovate, acute, auriculate at the base, glabrous on both sides, 8–12 inches long. *Sepals* 3, spreading.—*Petals* 9 oblong-lanceolate, attenuate at the base, 2–3 inches long.

White, fragrant. ♃. May. Mountains. 34–40 feet.

7. M. *Macrophylla.* *Stem* smooth with fragile branches, bark white.—*Leaves* deciduous, alternate, very large, 1–3 feet long, and 6–8 inches wide, crowded near the summits of the branches. *Flowers* large; petals 4–5 inches long, ovate.

White, tinged with purple, fragrant. ♃. June. Mid. Geo. 20–30 ft.

Remarks.—The individuals of this interesting genus, present subjects of much interest among the trees of their native forests. The majestic and noble appearance of the *Grandiflora*, the enormous leaves of the *Auriculata* and *Macrophylla* and the abundant odor of the *Glauca* during its season of flowering, perfuming the atmosphere of the sections of its growth, render the species of this genus conspicuous objects wherever they are found. The *Glauca* and *Acuminata* have been used in medicine, and an infusion of the bark or fruit in brandy is a popular remedy in rheumatism.

For cultivation, they require moist, rich soil, and much care is required to continue in vigor the growth of the larger leaved species.

Genus III. LIRIODENDRON.

Sepals 3, concave. *Petals* 6, obovate, lanceolate, campanulate. *Fruit* composed of densly imbricated carpels 1-2-seeded, the apices produced into lanceolate wings.

1. L. *Tulipifera*. *Leaves* 3-lobed, the middle lobe truncate, glabrous. *White wood.*
Greenish yellow, orange within. 4. May. Common. 100 feet. *Tulip tree.*

Remarks.—The Liriodendron is one of the largest trees of our forests, sometimes attaining the size of 8-9 feet in diameter, and 120-150 feet in hight. It possesses similar properties to magnolia. It has been used as a substitute for the Peruvian bark, in intermittents. The powdered bark is said to be most efficient in its operation.

Order III. ANONACEÆ.

Sepals 3–4. *Petals* 6, coriaceous, with a valvular æstivation, arranged in two rows, hypogenous. *Stamens* indefinite; filaments short, angular; anthers adnate. *Ovaries* numerous, closely packed; styles short, or none; stigma simple. *Fruit* succulent, or dry, composed of carpels separate, or united, 1 or many seeded. *Seeds* anatropous. *Albumen* ruminated. *Embryo* small. *Leaves* alternate, entire. *Flowers* axilary.

Genus I. ASIMINA.

(*Syn. Uvaria, Anona, Porcelia and Orchidocarpum.*)

Sepals 3, sometimes united at the base. *Petals* 6, the three outer ones larger. *Carpels* oblong, pulpy within, several seeded. Trees or shrubs.

1. A. *Parviflora*. A small shrub with a few branches near the summit. *Leaves* alternate, obovate, cuneate, mucronate, on short petioles. Branches covered with a brownish pubescence *Flowers* solitary. *Calyx* deciduous, pubescent. *Petals* 6, the 3 exterior ones twice as large as the calyx, pubescent. *Fruit* 1 in. long, fleshy.
Greenish purple. 4. May. On the coast of Car. and Geo. 2–3 feet.

2. A. *Triloba*. A small tree, with alternate, slender and glabrous branches *Leaves* glabrous, oblong-ovate, acuminate, alternate, on short petioles. *Flowers* solitary. *Petals* nearly round, much larger than the calyx. *Fruit* 2–3 inches long, eatable, with 6–8 seeds. *Papaw*
Brownish purple. 4. April. Middle Geo. 15–20 ft.

3. A. *Grandiflora*. *Leaves* cuneate, obtuse, with the under surface and branches covered with a ferruginous pubescence. *Flowers* few, large; the outer petals obovate, 2–3 inches long.
Yellowish white. 4. April. Middle Car. and Geo. 1–2 feet.

4. A. *Pygmæa*. *Leaves* coriaceous, long, 4–6 inches, cuneate, obtuse, oblong, obovate or eliptical, variable in size and form. *Petals* obovate-oblong, outer ones 1 inch long.
Reddish brown. 4. April. Geo. and Flor. 6–18 inches.

Order IV. SCHIRANDRACEÆ.

Flowers monœcious; staminate flowers 5-sepaled, 5 petal.

ed, anthers sessile; pistillate flowers, ovaries numerous, on a conical torus, which in maturity becomes elongated. *Carpels* baccate, 1 seeded, in maturity forming a loose spike on the elongated torus. *Albumen* fleshy, cotyledons ovate.

Genus I. SCHIRANDRA.

Sepals, and *petals* confounded, roundish, concave. *Anthers* connate. Before the *fruit* ripens the carpels are aggregated, as in the Rubus, but as it matures the torus lengthens and the carpels separate and do not form a mass as in the Rubus, but become detached and scattered.

1. S. *Coccinea*. A trailing *shrub*. *Leaves* alternate, variable, ovate or oval, sometimes denticulated, tapering at each end, frequently somewhat cordate. *Flowers* solitary, axilary, on short peduncles, upper ones staminate. *Carpels* small, red; torus red; *Seed* suspended.
Red. ♃ May—June. Rich damp soil. 10—15 feet.
Remarks. A handsome plant, and easily cultivated.

Order V.—MENISPERMACEÆ.

Flowers dicœcious, small, in racemes or panicles. *Sepals* and *petals* often confounded, hypogynous, deciduous. *Stamens* monadelphous, or separate, generally equal the petals in number, and opposite them, sometimes three or four times as many. *Anthers* adnate or innate, 4 lobed. *Ovaries* several, distinct. Drupes baccate, 1-seeded, incurved. *Seed* heterotropous. *Embryo* curved. Climbing shrubs or suffructicose plants. *Leaves* alternate, simple, palmately veined.

Genus I, COCCULUS.

(*Sym. Wendlandia, Menispermun.*)

Sepals 6 in a double series. *Petals* 6, fleshy, auricled. *Staminate flowers*, stamens 3—6, distinct; filaments thickened at the summit. *Pistillate flowers* sometimes, with 6 abortive stamens. *Ovaries* 3—6. *Drupes* 1—6.

1. C. *Carolinus*. *Stem* slender sarmentose, minutely pubescent. *Leaves* variable, cordate or ovate, or nearly orbicular, commonly with several obtuse lobes, mucronate, pubescent underneath, frequently coriaceous when mature. *Petals* with two inflexed auricles at the base of each. *Drupe* compressed, red; nut curved, forming nearly a ring.
White. ♄ June. Georgia to Mississippi.

Genus II. MENISPERMUM.

Flower dicœceous. *Sepals* 4—8 in a double series. *Petals* 4—8, sometimes none. *Stamens* numerous, distinct; anthers

4-lobed, 2-celled, adnate. *Ovaries* 2—4; drupes usually solitary, nut woody, globose reniform. Racemes axillary. Staminate and Pistillate flowers often dissimilar.

1. M. *Canadensa*. *Stem* climbing, slender, herbaceous or suffrutescose. *Leaves* sub-cordate, with 3–5 lobes, peltate, petiole obtusely angled, inserted near the base. *Flowers* small, sterile ones in paniculate supra-axillary compound racemes. *Sepals* 4–7, larger than the petals, obovate. *Petals* 6–7, orbicular, obtusely emarginate. Drupe black, when mature, curved so that the style is brought near the base; nut compound, forming nearly a ring.
Moon-seed.

Greenish Yellow. Common on banks of streams—8–12 feet.

2. M. Lyoni. *Stem* climbing. *Leaves* large, long-petioled, peltate, 3–5 lobed, cordate, lobes acuminate, hirsute on the veins beneath. *Sepals* 6, obovate, oblong, obtuse. *Staminate flowers* with 12 stamens, shorter than the sepals, cells of the anthers linear-oblong, filaments compressed. *Pistillate flowers* with 6 abortive stamens, stigmas sessile, fimbriate. *Drupe* oval, compressed, nut excavated in front, convex on the back.

4. July. Near New Orleans.

Order VI.—BERBERIDACEÆ.

Sepals in two rows, 3–4–6, deciduous, often surrounded by petaloid scales. *Petals* hypogynous, equal or double the number of sepals, and opposite them, generally with an appendage at the base. *Stamens* equal or double the number of petals, and opposite them. *Ovarium* solitary, 1-celled, style lateral, stigma orbicular. *Fruit* baccate or capsular. *Seeds* 1–2–3, attached to the bottom of the cell, or numerous, attached to the ventral suture.

Genus I. BERBERIS.

Sepals 6, generally bracteolate. *Petals* 6, with 2 glands at the base of each. *Stamens* 6, irritable, flying up on being touched at the base. *Stigma* sessile, orbicular, depressed. *Fruit* a berry, 1–9 seeded.

1. B. Canadensis. *Branches* thickly dotted, numerous, angular, when young, yellow, glabrous. *Leaves* simple, obovate, with remote spine-like serratures, obtuse, mucronate, cuneate at the base, glabrous, by pairs on young shoots, clustered on the summits of the last year's buds. *Flowers* in racemes, 6–8 flowered. *Sepals* ovate, acute. *Petals* ovate, emarginate, with 2 purple glands. *Berry* oval, red, acid. *Barberry.*

Yellow. 4. April. S. Car. 3—5 feet.

Remarks.—The Barberry of the gardens (which is the European variety) differs in some respects from the B. Canadensis above described. The berries are larger and more acid. It is cultivated for the berries and bark, the former are sour, and are used for their grateful acid flavor. They are used in preparing drinks in febrile diseases and are said to be an excellent laxative. The bark is used in medicine for sanative and in the arts for dying yellow. The coloring matter is a crystallizable substance called *berberin*.

Genus II. LEONTICE. (*Syn. Caulophyllum.*)

Sepals 6. *Petals* 6, opposite the calyx, bearing a reniform

scale within. *Carpel* stipitate, 2–4 seeded; seeds erect, globose.

1. L. Thalictroides *Stem* simple, glabrous. *Leaves* 3-ternate, leaflets ovate, oblique at the base, terminal one broadest, petiolate, radical ones with long petioles, cauline ones sessile, lower 3-ternate, upper smaller and 2-ternate. *Laaflets* incisely lobed. *Flowers* small, in panicles. *Seeds* oval, dark blue, stiped. *Pappoose Root.*

Greenish yellow. ♄. April. Upper districts of Car. & Geo. 12–14 in.

Genus III. DIPHYLLEIA.

Sepals 3, deciduous. *Petals* 6, without glands. *Stamens* 6; anthers oblong, 2-celled. *Ovary* ovate excentric; stigma subsessile, peltate. *Fruit* baccate, 1-celled, 2–3-seeded, seeds reddish.

1. D. Cymosa. *Root* perennial, thick. *Stem* herbaceous, erect. *Leaves* alternate usually 2 on each stem, peltate, deeply 2-lobed lobes angled, each division 7–9-lobed, serrate. *Flowers* in a terminal cyme. Petals oval. Style short.

White. ♃. June. Mountains. 1–2 feet.

Genus IV. JEFFERSONIA.

Sepals 4–5, colored, caducous. *Petals* 8–9, oblong. *Stamens* 8; anthers linear. *Ovary* obovate; stigma peltate. *Capsule* 1-celled, opening by a slit near the summit. *Seeds* arranged on a broad lateral placenta, in several rows. *Rhizoma* horizontal, throwing up a 1-flowered scape.

1. J. Diphylla. *Leaves* in pairs glaucous beneath. Stigma with an undulate margin. Pericarp coriaceous. *Twin Leaf.*

White. ♃. May. Mountains.

Remarks.—There are two varieties of this species; *a*, leaves obscurely sinuate or nearly entire, *b*, leaflets incisely 5–7 lobed.

Genus VI. PODOPHYLLUM.

Sepals 3, caducous. Petals obovate 6–9. *Stamens* 12–18; anthers linear. Stigma large, sissile, crenate. *Capsule* indehiscent, fleshy. *Seeds* numerous on a lateral placenta.

1. P. Peltatum. Rhizoma horizontal; stem simple, terminated by 2-leaves and 1-flower. *Leaves* peltate, 5–7 parted; lobes toothed or cleft at the apex. Flowers arising from between the leaves, large, nodding. *Mandrake, May Apple.*

White. ♃. May. Common. 12–15 inches.

Remarks.—The root of the Podophyllum is an important medicine. It is among the most powerful cathartics, and is said to resemble Jalap in its operations, and has been used as a substitute for that article in connexion with calomel. In billious complaints it is said to act very favorably. In minute doses it produces relief from distressing coughs in consumptions and catarrh. Full dose 20 grains of powdered root.

Order VII. CABOMBACEÆ. (*Syn. Hydropeltideæ.*)

Sepals 3, petaloid. *Petals* 3, alternate with the Sepals. *Stamens* 6–18–36 hypogynous; anthers innate. *Ovaries* 3–18. *Carpel* 1–2 seeded, terminated by the permanent style. *Seeds* orthotropous, globular, pendulous. *Embryo* minute; albumen fleshy, with the embryo at its base. *Plants* growing in the water, with floating, peltate leaves, the submersed leaves, with filiform lobes.

Genus I. CABOMBA. (*Nectris.*)

Sepals 3, petaloid. *Petals* 3. *Stamens* 6, as long as the calyx. *Carpels* numerous, 1–3 seeded somewhat fleshy. *Leaves* opposite.

1. C. Caroliniana. *Stem* branching. *Leaves* floating and submersed, the floating ones elliptical or oblong, about an inch long, submersed ones filiformly dissected. *Petals* oval, obtuse, with two yellow spots at the base. Sometimes only 2 sepals and 2 petals.
White. ♃. May. From N. C. to Lou.

Genus II. BRASENIA. (*Syn. Hydropeltis.*)

Sepals 3–4, persistent, petaloid. *Petals* 3–4, longer than the sepals. *Stamens* numerous. *Carpels* numerous, somewhat oblong, 1–2 seeded. All the submersed parts of the plant covered with a transparent, gelatinous substance.

1. B. Peltata. *Stem* long, slender, of a purplish color, no part of the plant being green but the upper surface of the leaves. *Leaves* alternate, the floating ones peltate, entire, eliptical. *Peduncles* 1-flowered, solitary.—Grows in still water. *Water shield.*
Brownish purple. ♃. July. Canada to Geo. 1–10 feet.

Order VIII. NELUMBIACEÆ.

Sepals 4–6, petaloid. *Petals* numerous, from the outside of the disk. *Stamens* numerous, in several rows; filaments petaloid; anthers introrse. *Disk* remarkably developed, with the ovaries lodged in separate cavities of its substance. *Fruit* a nut, abundant, crowned with the persistent style. *Seed* orthotropous without albumen. *Embryo* very large, with two fleshy cotyledons. Herbaceous plants growing in deep water.

Genus I. NELUMBIUM. (*Nymphæa, Cyamus.*)

1. N. Luteum. Peduncles arising from a rhizoma. *Leaves* large, 1–2 feet in diameter, peltate, orbicular. *Flowers* large. *Sacred Bean.*
Pale yellow. ♃. N. Y. to Lou. June.

Remarks.—This is one of the most splendid aquatic plants of North America. It yields a milky juice when wounded. The root bears tubers which are very farinaceous

and are used as food by the Indians. The flowers are the largest of any North American plant except the *Magnolia Macrophylla.* (Nuttall.)

Order IX. NYMPHÆACEÆ.

Sepals persistent 5–6. *Petals* numerous, imbricate. *Stamens* numerous in several rows, some of the filaments petaloid. *Anthers* adnate, introrse. *Fruit* many celled, fleshy, many seeded. *Seeds* anatropous, containing farinaceous albumen. *Embryo* minute. Aquatic plants, herbaceous.

Genus I. NYMPHÆA.

Sepals 4–5 persistent. *Petals* and *Stamens* numerous and passing into each other.

1. N. Odorata. *Rhizoma* very large. *Leaves* floating, nearly orbicular or cordate, strongly veined beneath. *Stigma* sessile, with numerous rays, incurved. The leaves of this plant vary considerably in form, giving rise to several varieties. The lobes of some being much more acute than those of others; and in one variety called the *N. Rosea* the leaves are smaller and flowers rose color. *White Pond-lily.*

White. 4. June. Common in ponds.

Remarks.—A beautiful plant distinguished by the delicious odor of its large white flowers. The genus is more properly the indigenous production of the East Indies. Several species growing there, and but one on the continent of North America. The plant has been sometimes employed in medicine, but we believe has pretty much passed from use. The Egyptian Lotus is a species of this genus, the N. Lotus, which is said to resemble our species.

Genus II. NUPHAR.

Sepals 5–6. *Petals* numerous, small, externally nectariferous, inserted with the Stamens into the base of the torus. *Fruit* fleshy, many celled, many seeded.

1. N. Advena. *Leaves* semi-orbicularly cordate, lobes diverging; petioles long, solitary. *Flowers* large, emerging. *Petals* and filaments nearly confounded. Cells of the fruit equal in number to the rays, and when perfectly matured separate spontaneously. *Yellow Pond-lily.*

Yellow. 4. July. Canada to Florida in deep water.

2. N. Sagittæfolia. *Leaves* on long sub-spiral petioles, membranaceous, nearly a foot long, sagittate, obtuse. *Petals* none; the inner sepals petaloid, the outer green.

4. Ju. N. C. to Geo.

Order X. SARRACENIACEÆ.

Sepals 5, persistent, æstivation imbricate, with a three leaved involucre. *Petals* 5, unguiculate, concave. *Stamens* numerous; anthers adnate, introrse. *Ovary* 5-celled, with a central placenta. *Stigma* very large, 5-angled, petaloid, peltate, covering the Stamens. *Capsules* 5-celled, 5-valved, many seeded, with loculicidal dehiscence. *Seeds* anatropous. Herbaceous plants, growing in swamps.

Genus I. SARRACENIA.

Roots fibrous. *Leaves* all radical, pitcher shaped, the petiole being formed into a tube generally inflated in the middle, and the lamina, which is small, generally inflected over the orifice. *Scape*, 1-flowered, flower nodding.

1. S. Purpurea. *Leaves* short, curved inwards, with a broad wing running down the tube, inflated, partially filled with water, lamina erect, cordate *Petals* inflected over the stigma. *Side-saddle Flower*
Purple. 4. June. Can. to Geo. in swamps. 1–2 ft.

2. S. Rubra. *Leaves* slender, elongated, with the wing linear, throat not contracting, lamina erect, mucronate, hairy on the inner surface, contracted at the base. *Petals* obovate, narrowed at the base.
Dark purple. 4. May. N. C. to Geo. 1–2 ft.

3. S. Flava. *Leaves* large, with throat expanding, scarcely any wing: lamina erect, reniform, with reflected margins, base contracted, mucronate, with purple veins. *Petals* obovate-oblong. *Stigma* very large, with each angle 2-cleft.
Yellow. 4. April. Middle Car. and Ga. 18 in. to 2 feet.
Croom thinks the *S. Catesbæi* of Elliott, is only a variety of the *S. Flava*.
[Sill. Jour. vol. 28, p. 167.

4. S. Drummondii. *Leaves* very long, erect, tube dilated above, with a very narrow wing; the upper portion as well as the orbicular, erect lamina whitish, and strongly reticulated with purple veins, 20–30 inches long. *Flower* large. Croom.
Purple. 4. April. Florida. 2–3 ft.

5. S. Psittacina. *Leaves* 3–4 inches long, decumbent, purple, spotted nearly all over with white; dorsal wing broad, lanceolate; appendix nearly closing the tube, and shaped like the head of a parrot. Grows in the wet pine barrens of Florida. [Croom, Sill. Jour. vol. 25, p. 75.

6. S. Variolaris. *Leaves* nearly erect, slightly ventricose, tube spotted on the back; lamina arched; wing slightly dilated. Petals obovate-spatulate, inflexed over the stigma.
Yellow. 4. Ju. Geo. and Car. in pine-barren ponds.

Remarks.—This genus affords a striking example of a great modification of the petiole, since there is no doubt that the tube part is the petiole, and what we called the lamina, the true lamina of the leaf. These tubes are generally filled with water, which is supposed to be secreted by the plant, and this always contains dead insects. The tube could not have been formed in a better manner to accomplish a given end, than this is to crush insects. The saccharine secretion, which surrounds the orifice, decoys insects to the tube, and the water entices them in; towards the bottom of the tube there are hairs pointing downwards so as to permit an easy decent, but makes the egress difficult.

Order XI. PAPAVERACEÆ.

Sepals, 2–3, caducous, æstivation imbricate. *Petals* 4–6. *Stamens*, as many as the petals, or some multiple of their number; anthers innate. *Ovary* composed of 2 or more carpels. *Stigma* generally sessile. *Fruit* 1-celled, many seeded, with parietal placentæ either opposite or alternate with the stigmas. *Seeds* minute, anatropous, albumen oily. *Plants* generally with a milky, or yellow juice, often acrid and generally narcotic. *Flowers* all belonging to the *yellow* series.

Genus I. ARGEMONE.

Sepals 3, caducous. *Petals* 6. *Stamens* numerous. *Stigmas* 4–7 sessile, or nearly so. *Capsule* opening by valves separating from the placentæ. *Herbs* with a yellow juice.

1. A. Mexicana. *Leaves* alternate, pinatifid, and spiny. *Flowers* solitary, axilary and terminal. *Calyx* and *capsule* prickly.

There seems to be several variations from the above description, which constitute varieties of this species. The flowers vary much in size and color, and in some the capsule is not prickly. We have never met with such a one. *Prickly Poppy.*

White. ☺. From June through the summer. In cultivated places, common.

Genus II. SANGUINARIA.

Sepals 2, deciduous. *Petals* vary from 8–12. *Stamens* numerous. *Stigmas* 2, sessile. *Capsule* oblong-ovate. *Seeds* numerous. *Rhizoma* yellowish red.

1. S. Canadensis. *Leaves* reniform, palmate, 5–7 lobed, glaucous. *Petals* oblong caducous; scape 1-flowered. *Plant* yields a light red juice.

White. ♃. March. Common. *Blood Root.*

Remarks.—This plant enjoys considerable reputation, both in the regular practice of medicine and in the family practice. It is a powerful medicine, and should be used by those unacquainted with it with care. It is a stimulant in small doses; in larger produces violent vomiting and much irritation. It is one of the earliest and prettiest flowers of spring, and as an early border flower, deserves the attention of the florist.

Genus III. CHELIDONIUM.

Sepals 2, caducous. *Petals* 4, small. *Stamens* numerous. Capsules 2-valved, 1-celled, many seeded, linear, dehiscing from the base upwards. Yields a deep yellow juice.

1. C. Majus. Leaves pinnate-lobed, glaucous, segments ovate, the terminal one obovate. *Flowers* in axilary umbels. *Celandine.*

Yellow. ♃. Naturalized. Grows in waste places.

Genus IV. GLAUCIUM.

Sepals 2, caducous. *Petals* 4. *Capsule* linear 2-valved, 2-celled, many seeded. *Seeds* somewhat reniform. Plant yielding a yellow juice.

1. G. Flavum. *Stem* glabrous. Floral leaves repand; cauline ones, clasping and pinnatifid; radical ones bipinnatifid, large, pubescent. *Peduncles* one flowered. *Capsule* tuberculate. *Horned Poppy.*

Yellow. ☺. June. Introduced.

Order XII. FUMARIACEÆ.

Sepals 2, deciduous. *Petals* 4, cruciate; one or both of the two outer ones saccate or spurred at the base; the two inner cohering at the apex, and enclosing the anthers and stigma. *Stamens* 6, in two parcels; anthers membranous, adnate ex-

trorse, the lateral ones of each parcel one celled, the middle one 2-celled. *Ovary* 1-celled, 2-valved, with parietal placentæ; style filiform; stigma with 2 or more points. *Fruit* a nut or capsule, if a nut 2-seeded, if a capsule many seeded. Seeds arilled, anatropous. *Herbaceous* plants, with watery juice.

Genus I. DIELYTRA.

Sepals 2. *Petals*, 2-spurred or saccate at the base. Capsule many seeded, pod-shaped. *Flowers* in a compound raceme, with cymose branches.

1. D. Formosa. Leaves 3-8 or one rising from the crown of the rhizoma. *Spur* short, obtuse, somewhat incurved; wings of the inner petals projecting beyond the summit. *Stigma* 2-horned at the apex. (*Torrey & Gray.*)
Reddish-purple. 4. Mountains of Vir. and N. C. 8-12 inches.

Genus II. ADLUMIA.

Petals united into a spongy, persistent, monopetalous corolla, bi-gibbous at the base, 4-lobed at the apex. *Capsule* pod-shaped, linear-oblong, many seeded. *Flowers* in racemose cymes. *Plant* climbing, herbaceous.

1. A. Cirrhosa. *Stem* branching, climbing by cirrhose tendrils. *Leaves* bi-ternately divided, segments obovate. *Flowers* numerous. *Stamens* monodelphous. *Climbing colic weed.*
Pale violet or white. ♂. June. Canada to N. C.

Genus III. CORYDALIS.

Only one of the petals spurred. *Capsule* 2-valved, many or few seeded, compressed; style persistent. *Racemes* terminal or opposite the leaves, simple.

1. C. Aurea. *Stem* branching. *Leaves* bi-pinnate, or variously dissected, lobes oblong, linear, glaucous, alternate. *Spur* straight, obtuse. *Flowers* in terminal, supra-axilary racemes, or opposite the leaves. *Pedicels* bracteolate with bracts sometimes extending beyond the flower.
Yellow. ☉. April to August. Mountains.

Genus IV. FUMARIA.

One petal only gibbous or spurred. Fruit a 1-seeded nut, indehiscent.

1. F. Officinalis. *Root* annual, fusiform. *Stem* branching, glabrous. *Leaves* variously dissected, glabrous, and slightly glaucous, segments many cleft. *Flowers* in small, dense racemes; sepals toothed; petals 4 the lower one free, the 3 upper united at the base bearing a spur. *Stigma* bi-lamellate.
Purple ♂. April. Naturalized. *Fumitory.*

Remarks.—The order *Fumariaceæ* possesses some striking peculiarities. The general form of the flower is singular, resembling more the works of art than of nature.

The characteristic of having the different celled anthers some unilocular and others bilocular is a striking variation. Torrey & Gray remark, that "the two lateral Stamens of each parcel, having unilocular anthers, may be considered as *half* Stamens, formed by the division of the two Stamens which correspond to the inner petals; the true number in the order according to this view being 4, one to each petal." The situation of the anthers and stigma in the indurated summit of the petals, in which they remain firmly enclosed till after fertilization, would seem to preclude the possibility of the pollen's coming in contact with the stigma. To adapt herself to these circumstances, nature has placed two horn-like appendages to the stigma, which extend under the anther cells and by the mere contraction of the valves the pollen is conveyed to the stigmatic surface without any change in position of the organs. The different genera of this order possess nearly the same properties, and the Fumaria has been used in medicine, particularly for its action on the liver and in cutaneous eruptions.

Order XIII. CRUCIFERÆ.

Sepals 4, deciduous, cruciate, æstivation generally imbricate. *Petals* 4, cruciate, alternating with the Sepals. *Stamens* 6, tetradynamous, the two shorter lateral, occasionally toothed, inserted lower than the others. *Disk* often with small green glands inserted between the petals and the stamens and ovarium. *Ovary* one celled consisting of two carpels, with two parietal placentæ, which are reflected into the cavity where they unite and form a false dissepiment. *Stigma* opposite the dissepiments (a remarkable variation.) *Fruit* a silique or silicle, 2-celled produced by the spurious dissepiment mentioned above, one or many seeded. *Seeds* campulotropous, attached in a single row to each side of the placentæ. Herbaceous plants, with a watery and generally, with an acrid juice.

Tribe I. ARABIDEÆ.

Fruit a silique. *Septum* linear. *Seed* compressed, with the radical on the side (*Pleurorhiza*,) cotyledon flat.

Genus 1. DENTARIA.

Silique lanceolate, dehiscing elastically; valves nerveless, plane, dissepiment somewhat fungus. *Stigma* emarginate. *Rhizoma* fleshy often dentate. Perennial, herbaceous plants, with variously divided leaves.

1. D. Laciniata. Rhizoma moniliform, tubers slightly connected. *Leaves* usually 3, ternate, leaflets incised or irregularly notched, lateral ones lobed; radical leaves sometimes wanting. *Flowers* in terminal racemes, sepals lanceolate, acute. *Petal* much larger than the sepals. Taste of the root pungent, like mustard.
Pale purple. 4. May to June. Mountains and Middle Ga. 4–12 in.

2. D. Diphylla. Rhizoma toothed, creeping. *Leaves* cauline 1–2. ternately divided, leaflets ovate, oblong, toothed and incised; petioles about 1-inch long. Root very pungent. *Pepper Root.*
Pale purple. 4. May to June. Mountains.

3. D. Multifida. *Rhizoma* tuberous. Leaves 2, opposite, 2–3 inches

long variously divided; segments and lobes linear. *Flowers* in a terminal raceme. *Sepals* lanceolate. Petals much longer than the sepals.
White. ♃. N. C. Alabama. 4–6 inches.

Genus II. CARDAMINE.

Silique linear, usually dehiscing elastically, with revolute valves; valves nerveless. *Sepals* expanding at the summit. *Seeds* ovate.

1. C. Spathulata. *Stem* decumbent, slender, glabrous. Radical *leaves* spatulate, pubescent, about an inch in length, entire; cauline ones narrow and somewhat toothed. *Flowers* in terminal and axilary racemes. *Sepals* hairy, oval. *Petals* oblong and ob-ovate. Silique about an inch long.
White. ☉. April. Mountains and Mid. Dist. of Geo. & Car. 4–6 in.

2. C. Virginica. *Stem* erect glabrous. *Leaves* alternate, pinnate, leaflets lanceolate, with a single tooth on one or both sides. *Flowers* in terminal racemes, erect. Petals a little longer than the sepals; stigma sessile. Varies much during the summer, and in different locations, so that any discription may be inapplicable under different circumstances.
White. ♃. April to June. Upper districts of Geo. Car. 4–12 inches.

The Pennsylvanica of Elliott, and Virginica, are supposed to be a variety of the *Hirsuta* of Linnæus.

Genus III. NASTURTIUM.

Silique nearly terete, sometimes resembling a silicle, usually curved. Stigma 2-lobed. *Sepals* spreading. *Seeds* arranged in two series, minute, destitute of margins. Found in wet places.

1. N. Officinale. *Leaves* pinnately divided; segments ovate, sub-cordate, repand. *Petals* longer than the calyx.
White. Introduced.

2. N. Taxaletifolium. *Stem* much branched, diffuse. *Leaves* pinnately divided, lobes sinuate or toothed, obtuse, smooth. *Flowers* small; petals linear. *Stigmas* nearly sessile. *Siliques* erect or curved. *Seeds* numerous.
Yellow. ♂. South Carolina. 5–12 inches.

3. N. Palustre. *Leaves* pinnatifid, 2–3 inches long, clasping and ciliate at the base, lobes confluent, toothed, glabrous, oblong-lanceolate. *Flowers* very small; petals equal the sepals. *Silique* deckned, ovate-oblong, a little curved.
Yellow. ♃. June to August Wet places. 1–2 feet.

Genus IV. ARABIS.

Silique linear, generally compressed, terminated by the sessile stigma, valves 1-nerved. Seeds in one series, orbicular, compressed. Calyx erect.

1. A. Canadensis. *Stem* simple, glabrous towards the summits, pubescent below. *Leaves* alternate, sessile, pubescent, oblong-lanceolate, remotely toothed, the lower ones petiolate and occasionally lyrate. Flowers in long terminal racemes. *Sepals* hisped, colored. *Petals* oblong-linear, much longer than the sepals. *Silique* long 2–3, inches, linear, curved. *Sickle-pod.*
White. ♃. June. Middle Georgia.

Genus V. LEAVENWORTHIA.

Calyx somewhat erect, equal at the base. *Petals* equal, cuneiform, truncate, emarginate. *Filaments* distinct, toothless. *Silique* sessile, oblong-linear, compressed, somewhat inflated, and contracted between the seeds; valves indistinctly nerved. *Style* distinct or almost none; Stigma minutely bidentate. *Seeds* in a single series, flattened, with a broad winged margin. Annual herbaceous plants. *Leaves*, lyrately-pennatifid. *Flowers* in loose scapoid racemes, or solitary on long sub-radical peduncles.

1. L. Aurea. *Stem* at first short and simple, but at length branching from the base, branches ascending. *Leaves* mostly radical, pinnatifid, somewhat fleshy; segments 2–4 pairs, roundish oblong, obtusely toothed. *Racemes* 4–10 flowered. *Sepals* loose, oblong, obtuse, tinged with purple. *Petals* golden yellow tapering into a long cuneate base. *Silique* rather more than an inch long. *Seeds* 4–5 in a cell. *Torrey & Gray.*

Alabama. 2–6 inches.

Tribe II. SISYMBREÆ.

Seeds with the radicle on the back, (*notorhiza*) never on the side, not bordered.

Genus VI. SISYMBRIUM.

Silique terete, or slightly angled, with a short beak. *Stigma* capitate. *Sepals* equal at the base, expanding. *Petals* expanding. *Seeds* ovate or oblong.

1. S. Canescens. *Root* annual. *Stem* erect, branching. *Leaves* 2–3 inches long, hoary, doubly-pinatifid; segments hoary, dentate, obtuse. *Flowers* in terminal racemes. *Sepals* oval, pubescent. *Petals* obovate, equaling the calyx, expanding. *Silique* somewhat clavate, half as long as the pedicels, angled. *Seeds* obovate, many in each cell.

Yellowish. ☉. March and April. Common. 1–2 ft.

2. S. Officinale. *Stem* hairy. *Leaves* runcinate hairy. *Flowers* in elongated racemes, small, pedicels very short, appressed to the axis after flowering. *Petals* cuneate, larger than the calyx. *Silique* subovate, tapering into a short style.

Yellow. ☉. May and Aug. Waste places. 1–3 ft. *Hedge Mustard.*

Remarks.—The latter plant possesses somewhat the pungency of mustard, and has been recommended in the treatment of chronic coughs, hoarseness, and ulceration of the mouth. The juice with sugar, or the seeds may be taken.

Genus VII. ERYSIMUM.

Silique columnar, 4-sided. *Sepals* deciduous, closed. *Style* short. *Stigma* small. *Cotyledons* oblong.

1. E. Cheiranthoides. *Stem* simple or branched with a minute appressed pubescence, somewhat scabrous. *Leaves* lanceolate, entire, sometimes denticulate. *Silique* erect, about an inch long. *Flowers* small.

Yellow. July and Aug. ☉ *a* ♂. 1–2 ft. Along streams.

Genus VIII. WAREA. (*Cleome of Ell.*)

Silique flat, stiped, elongated, slender, curved pendulous.—*Sepals* deflected, spatulate, or ligulate, colored, caducous. *Petals* spreading, with long claws. With six glands at the base of the stamens. *Leaves* entire.

1. W. Amplexifolia. *Stem* branched above, glabrous. *Leaves* oblong, ovate, acute. *Flowers* in umbel-like racemes, much crowded; petals with the limb nearly orbicular, claw longer than the limb. Silique linear, stipe filiform pur; ish.

Pale purple. ☉. Florida. 1-3 ft.

2. W. Cuneifolia. *Stem* branched above, glabrous. *Leaves* nearly sessile, oblong, obtuse, upper ones oblong-linear. *Racemes* with the flowers clustered at the extremities of the branches. *Sepals* minute. *Petals* with the limb nearly round, supported on a long claw. *Stamens* longer than the petals. *Anthers* linear. *Stigmas* sessile. *Silique* filiform, nearly 2 inches long.

White tinged with purple. ☉. June and Aug. Middle Geo. and Car. 1-2 feet.

Remarks.—The last species is a beautiful plant, and would well repay the florist's care, if it improved none by cultivation.

Tribe III. BRASSICEÆ.

Silique dehiscent. *Seeds* globose with the radicle on the back. Annual and biennial herbs.

Genus IX. SINAPIS.

Silique nearly terete, nerved. *Style* short, acute. *Seeds* in a single series. *Sepals* spreading. *Leaves* usually lyrate. *Flowers* in elongated racemes.

1. S. Nigra. Lower leaves large, lyrate, scabrous; upper ones lanceolate entire, glabrous. *Sepals* colored. *Petals* obovate, unguiculate. *Silique* appressed, about ¾ of an inch long, glabrous. *Black Mustard.*

Yellow. ☉. June. Introduced.

Remarks.—The seeds of the S. Nigra, (common mustard) are too extensively known and used to demand a notice of their properties here. There are circumstances connected with the exhibition of their well known properties, which are singular and interesting. The mustard seeds in a perfectly dry state, may be pressed and made to yield an oil, possessing none of the active properties of mustard, these remaining in the seed. But if the oil be obtained by water, it is powerful in its operation, producing speedy vesication. This latter oil it seems does not exist ready formed in the seed, but is formed by the action of the water. The chemical difference of the two is probably, that the latter contains sulpher, as this is found in the white mustard in a principle called *Sulpho-sinapisin*, possessing the same properties as this oil, and formed by the action of water.

Tribe IV. SELENIEÆ.

Septum broad and membranaceous. *Seeds* inverted.

Genus X. SELENIA

Silicle broadly oval, acute at the base, margined. *Seeds* orbicular, 4-6 in each cell, with a broad, thin, cartilaginous border. *Sepals* colored; glands 10. *Petals* erect.

1. S. AUREA. *Stem* 3-sided, branching. *Leaves* pinnately parted, segments of radical ones more or less toothed. *Flowers* in leafy racemes. *Sepals* linear-oblong, yellow. *Petals* spatulate, longer than the calyx. *Seeds* in a double series, orbicular, dotted, with a thin rigid border. Radicle scarcely half as long on the cotyledons.

Yellow, fragrant. ☉. Florida. March—April. 4–8 inches.

TRIBE V. ALYSSINEÆ.

Silicle dehiscent; valves plain or convex; septum broadly oval, membranaceous. *Seeds* compressed, with the radicle on its side.

GENUS XI. VESICARIA.

Silicle globose or ovate, with hemispheric valves. *Seeds* sometimes margined, 8–12. *Petals* entire.

1. V. PALLIDA. *Stem* somewhat pubescent, slender, decumbent, much branched. *Leaves* sessile, narrowed at the base, coarsely toothed. *Sepals* hairy eliptical, oblong. *Petals* obcordate, longer than the calyx. *Style* distinct. *Silicle* globose, glabrous two celled with 6 ovules in each cell.

Nearly white. ☉. Florida. 12–15 inches.

GENUS XII. DRABA.

Silicle oblong-lanceolate or oval, minutely hispid, especially along the margin, or glabrous. *Seeds* numerous. *Calyx* equal. *Petals* emarginate or entire.

1. D. CUNEIFOLIA. *Stem* leafy at the lower part, very pubescent, slender. *Leaves* with few teeth; cauline ones oblong-ovate, narrowed at the base: radical ones spatulate-oblong. *Flowers* large; petal several times the length of the calyx.

White. ☉. Florida. 4–8 inches.

2. D. CAROLINIANA. *Stem* leafy and hispid at the base, naked and smooth above. *Leaves* hispid, entire. *Flowers* corymbic or racemed; petals oblong twice as long as the sepals, or minute, and sometimes wanting. *Silicle* nearly linear, glabrous, 4–6 lines long, many seeded.

White. ☉. April & June. Middle Geo. 1–6 inches.

3. D. BRACHYCARPA. *Stem* simple or branched, leafy. *Leaves*, cauline ones linear or oblong, with 2 or 3 minute teeth or entire; radical ones roundish ovate, petioled. *Flowers* in racemes, many flowered; silicles oval, glabrous, cells 5–6 seeded, petals entire or slightly emarginate.

Var. FASTIGIATA. *Stem* more pubescent, seldom branched; radical leaves generally 4 toothed, silicle pubescent.

White. ☉. March—April. Middle Georgia.

TRIBE VI. LEPIDINEÆ.

Silicle compressed opposite the narrow septum; valves boat-shaped. *Radicle* never turned to the side, but generally on the back.

Genus I. LEPIDIUM.

Silicle cordate, emarginate, 2-seeded; valves keeled. Seeds compressed.

1. L. Virginicum. *Stem* herbaceous, branching generally, leafy, glabrous. *Leaves* alternate, sessile, ciliate, notched, upper ones smaller and nearly entire. *Flowers* in terminal racemes. *Sepals* lanceolate, membranaceous along the margin, pubescent on the back. *Petals* a little longer than the sepals. *Silicle* compressed, orbicular slightly emarginate. *Wild pepper grass.*
White. ☉. Through the summer. Common.

Tribe VII. CAKILINEÆ.

Silique or *Silicle* separating, into several 1-celled, 1-seeded joints. *Seeds* with the radicle on the side, accumbent.

Genus I. CAKILE.

Silicle lanceolate, somewhat 4-angled, jointed. *Seed* in the upper cell erect in the lower pendulous. Annual maratime herbs.

1. C. Maratima. *Stem* erect, with expanding branches. *Leaves* alternate, oblong-cuneiform, sinuately toothed, lower ones sometimes nearly hastate. *Flowers* in terminal corymbose racemes. Lower joint of the silicle short, the upper one with a line on each side. Seed 1 in each joint, oval glabrous.
White. ☉. April—July. On the coast.

Remarks.—This plant deserves the attention of the gardner as a culinary vegetable. It has been in some cases cultivated and has always been highly esteemed.

Order XIV. CAPPARIDACEÆ.

Sepals 4, deciduous, sometimes marcescent, æstivation imbricate, or united forming a tube. *Petals* 4, hypogynous, cruciate, unguiculate, sometimes a nectary at the base of the outer petal, more or less unequal. *Stamens* almost perigynous, 7–12, or many, seldom 4. *Disk* hemispherical or elongated. *Ovary* compressed, of 2-carpels united, stipitate, with parietal placentæ, styles united, filiform, or none. *Fruit* a 1-celled, pod-shaped capsule, many seeded. *Seeds* campulitropous, reniform, albumen wanting. Embryo curved. Annual plants. *Leaves* alternate, stipulate.

Genus I. CLEOMELLA.

Sepals minute, spreading. *Petals* 4, sub-spatulate. *Torus* oblong. *Stamens* 6. *Pod* 4–6-seeded, obovate; stipe filiform. *Embryo* conduplicate. *Leaves* compound, leaflets linear. *Flowers* in terminal racemes, leafy.

1. C. Mexicana. *Stem* branching, glabrous. *Leaves* with flat linear-lanceolate leaflets, longer than the petiole. *Pod* flattened. *Style* short.
Yellow. ☺ Louisiana.

Genus II. GYNANDROPSIS.

Sepals spreading. *Petals* 4. *Torus* elongated. *Stamens* 6, adhereing to the torus. *Pod* raised on a long stipe rising from the summit of the torus.

1. G. Pentaphylla. *Stem* pubescent, glandular. *Leaves* 3-5 foliate, upper and lower 3, middle 5, leaflets obovate entire, or slightly serrulate. *Flowers* in a terminal raceme; calyx deciduous; petals with long slender claws. *Pod* 2-3 inches long.
White ☺. May—July. In cultivated grounds. Introduced. 2-3 feet.

Genus III. POLANISIA.

Sepals 4, spreading. *Petals* 4, unequal, entire, nearly orbicular on short claws. *Stamens* 8–12 on the receptacle. *Torus* minute. *Pod* linear, scarcely stipitate. Annual plants.

1. P. Tenuifolia. *Stem*, slender, branched, viscid, glandular. *Leaves* trifoliate, nearly glabrous; leaflets linear, filiform. *Flowers* in racemes, pedicels filiform; styles longer than the ovary. *Plant* with an unpleasant odor.
Nearly white. ☺. June. Georgia, low country. 1-2 feet.

Order XV. POLYGALACEÆ.

Sepals 5, persistent, the two lateral ones introrse and large, and petaloid, the three exterior small. *Petals* 3, irregular, somewhat papilionaceous, the keel crested. *Stamens* hypogynous, from 6–8, monadelphous, with the tube split on the upper side. *Ovary* consists of two carpels, with a central placenta, 2-celled, with a solitary ovule in each cell, pendulous. *Seeds* anatropous, with much albumen. Embryo generally straight, as long as the albumen. Herbaceous, with bitter root.

Genus I. POLYGALA.

Sepals 5, permanent, unequal, the two lateral ones larger, colored. *Petals* 3, united to the tube of stamens. *Fruit* a capsule, 2-celled, compressed, obcordate, or eliptical. *Flowers* in racemes, approaching in different cases spikes or heads, more commonly the latter.

(a.) *Flowers capitate or in spikes. Seeds with a 2-lobed caruncle.*

1. P. Sanguinea. *Stem* branched. *Leaves* linear, acute, less than an inch long. *Flowers* capitate or in an oblong spike. Wings membranaceous, bright rose color. *Crest* minute. *Capsules* obovate. *Seeds* black.
Red. ☺. Aug.—Sept. In dry soils, common. 4-6 inches.

2. P. Purpurea. *Stem* fastigiately branched, sometimes simple, erect angular and slightly winged. *Leaves* alternate, linear-lanceolate 1-inch long. *Flowers* in oblong spikes; wings broad-ovate, green, tinged with purple; crest minute. *Seeds* hairy, with a *caruncle*, nearly as long as the seed, nearly black.
Red. ☉. June. Common. 8–12 inches.

3. P. Crucіata. *Stem* erect, branching, winged. *Leaves* verticillate, linear, pungent. *Flowers* in ovate spikes, nearly sessile; stamens short; wings dotted at the base with a purple border; crest minute. *Seed* obovate, slightly hispid.
Red, with green. ☉. July. 8–12.

4. P. Lutea. *Stem* branched or simple. *Flowers* in an ovate spike, nearly globular; wings, broad lanceolate, acuminate, yellow; crest minute. Radical *leaves* spatulate, the cauline ones lanceolate, acute. *Seeds* hairy.
Yellow. ☉. June—September. Common. 8–12 inches.

5. P. Nana. *Stem* simple. *Leaves* cuneate, obovate, obtuse, sometimes with a long attenuated base. *Flowers* in a dense cylindrical spike, nearly sessile; wings, ovate acuminate, with a setaceous point, yellowish-green; crest large. *Seed* obovate, a little hairy.
Yellowish-green. ☉. June—Sept. Pine-woods. 1–6 inches.

(*b.*) *Flowers in terminal cymes; caruncle with no or very small appendage.*

6. P. Corymbosa. Ramosa. *Stem* simple, angular, terminated with a large cyme, nearly naked. *Leaves* spatulate, the upper ones linear and at the summit small. *Flowers* in a compound cyme; wings oval, long, mucronate, greenish-yellow. *Seed* oblong.
Yellow. ♃. June—Aug. Wet places in pine barrens. Common. 8–12 in.

7. P. Cymosa. Corymbosa. *Stem* erect, terete, nearly naked. Lower *leaves* long, linear-lanceolate upper ones small, linear, at the summit degenerated into scales. *Cyme* simple; wings oval or elliptical-oblong, obtuse, slighly mucronate. *Seeds* smooth.
Yellow. ♃. June—Aug. Common in wet pine barrens. 2–5 feet.

8. P. Baldwini. *Stem* erect, branching near the summit, leafy. *Leaves*, lower ones spatulate, upper ones lanceolate. *Flowers* in a compound cyme, sub-globose, compact; wings lanceolate longer than the corolla, keel but slightly fimbriate, if at all. *Seeds* ovate, very hairy.
Yellowish white. ♃. June—August. Low country of Geo. 2–3 feet.

(*c.*) *Flowers in cylindrical spikes; caruncle spongy, cristate.*

8. P. Incarnata. *Stem* simple, slender, slightly angled. *Leaves* scattered, subulate, nearly linear. *Flowers* in long terminal spikes; wings oval, margin colored, limbs of the petals not united; crest conspicuous. *Seeds* ovate, hairy.
Purple. ♃. May—Aug. Common in the middle region of Geo. 1–2 ft.

9. P. Setacea. *Stem* very small, erect, angled, generally with several slender, erect branches. *Leaves* very small, setaceous. *Flowers* in a compact spike, small; wings oblong, acuminate; limbs of the lateral petals ovate; crest conspicuous. *Seeds* ovate, hairy.
Rose color. ☉. Ju. Middle Car. & Geo. 10–12 inches.

(*d.*) *Flowers in elongated, racemose spikes, caruncle with a 2-lobed appendage.*

10. P. Verticillata. *Stem* erect, branching. *Leaves* verticillate, linear, acute, glabrous. *Flowers* in pedunculate, tapering spikes, dense; wings nearly round or obovate, longer than the corolla; lateral petals spreading; keel fimbriate. *Seeds* hispid.
Greenish white. ☉. June—Aug. Old sandy fields. 6–10 inches.

11. P. Senega. *Stem* erect, simple, terete. *Leaves* alternate, lanceolate, sometimes broad, acute, acuminate. *Flowers* in a dense spike, sessile, wings orbicular, obovate, concave. *Seed* hirsute, with spreading hairs.
White. ♃. Mountains and upper districts of Car. & Geo. 6–8 inches

12. P. Boykinii. *Stem* branching. *Leaves* verticillate by fours or fives, obovate, lanceolate. *Flowers* in dense tapering spikes, pedicillate; wings obovate; petals obovate scarcely as long as the wing; crest minute. *Seed* hirsute, with appressed hairs.

☺. June—September. Middle Georgia. 12–18 inches.

13. P. Chapmanii *Stem* glabrous, branching from the base or summit. *Leaves* numerous, linear, subulate. *Flowers* in a loose spike; wings with a short claw, the posterior sepal very broad, obtuse; scarcely any crest; limb of the petals distinct. *Seed*, black, hairy; lobes of the caruncle small.

Rose color. ☺. Florida. 12–15 inches.

14. P. Polygama. *Stem* glabrous, angled, branching from the base, numerous. *Leaves* sessile, oblong, linear, mucronate. *Flowers* pedunculate, in loose racemes; wings with short claws; keel 3-lobed, middle lobe fimbriate. Radical racemes destitute of corolla or wings.

Purple or reddish-purple. ♂. Dry lands, common. 6–12 inches.

(*d.*) *Flowers in loose racemes; keel not cristate. Caruncle without appendages.*

15. P. Grandiflora. *Stem* erect, pubescent, branching. *Leaves* oblong-lanceolate acute, pubescent, strongly veined. *Flowers* 12–18, the lowest more remote; pedicels recurved after flowering; wings large, nearly round, covering the other parts of the flower, when first expanded red, afterwards green. *Seed* villous.

Red. ♃. May to Aug. S. C. & Georgia. Dry soils. 8–12 inches.

(*e*) *Flowers few, axillary or terminal.*

16. P. Paucifolia. *Stem* simple, erect, naked at the base, leafy at the summit, rising from a branching rhizoma. *Leaves* clustered, ovate, petioled. *Flowers* generally terminal, by threes, larger than those of any other species; keel fimbriate; wings, obovate, attenuate at the base. Lateral petals united with the keel nearly to the summit.

Purple. ♃. May—July. Mountains. 3–4 inches.

Remarks.—The *P. Senega* or *Seneca snake root* is the only plant of this order appropriated to any use, in this country; although several of the species are beautiful flowers, and would make ornaments of the flower garden. The root of the *Senega* is extensively used as a medicine, and possesses valuable properties, among the most important is its action as an expectorant; on this account it enters into the composition of most medicines for coughs, croup, asthma, and affections of the lungs. It is entirely an American medicine, being first used in Virginia. It is cathartic and is used in combination with other medicines, for this property.

Order XVI. VIOLACEÆ.

Sepals 5, persistent, æstivation imbricate, usually auricled, or elongated at the base. *Petals* 5, hypogynous, marcescent or deciduous, with an oblique, convolute æstivation, one spurred at the base, generally unequal. *Stamens* 5, alternate with the petals; anthers adnate, bilocular; filaments extending beyond the anthers, two of them appendaged at the base. *Ovary* 1-celled, with 3-parietal placentæ; capsule many seeded, with a loculicidal dehiscense. *Seeds* anatropous, with a conspicuous chalaza. Herbaceous plants.

Genus I. VIOLA.

Sepals 5, unequal, auricled at the base. *Petals* 5, irregular, with a horn at the base of one of them. *Stamens* 5; anthers cohering, the two lower ones with appendages on the

back. *Capsule* 3-valved, 1-celled. *Seeds* caruncled. *Leaves* alternate. *Flowers* nodding. Perennial, herbaceous plants.

a.) without stems, scape and leaves arising from a rhizoma. Stigma with a recurved beak.

1. V. Pedata. *Leaves* pedate, 7-parted, segments entire, linear lanceolate, slightly pubescent or glabrous. *Stigma* thick, margined; beak short. *Petals* glabrous.

Blue or nearly white. 4. April—May. Common in the middle and upper country of Georgia. 4–6 inches.

2. V. Palmata. Rhizoma. *Leaves* thick, cordate, very variable, pubescent, palmate, 5–7-lobed, lobes of various forms, toothed, the middle one the largest. *Sepals* lance-ovate, ciliate; *petals* entire, veined, white at the base, lateral petals bearded, the upper one marked with blue lines. Early plant with almost entire leaves. A variable plant.

Bright blue, sometimes pale. 4. May. Common. 4–6 inches.

3. V. Cucullata. *Leaves* reniform or cordate, cucullate, serrate, generally glabrous. *Sepals* subulate, acuminate. *Petals* white at the base, lateral ones bearded, which with the upper one, marked with blue lines. *Stigma* triangular, margined.

There have been several varieties found of this species by Botanists, but the situation and the time when observed, will account for nearly, if not quite, all the variations. In open dry places the plant is pubescent; in spring, the leaves are almost uniformly cordate, in fall as uniformly reniform; the color of spring is blue, of summer, nearly or quite white.

Blue or purplish-blue. 4. Common. 4–6 inches.

4. V. Septemloba. *Leaves* ovate-cordate, slightly succulent, glabrous, dentate, lower leaves entire, the others pedate, 7-lobed, middle lobe the largest. *Sepals* lanceolate. *Petals* entire, upper ones large, villose, lateral ones densely bearded, marked with blue lines.

White. 4. March. Low country of Car. & Geo.

5. V. Sagittata. *Leaves* oblong, acute, cordate, sagittate incised at the base, pubescent, slightly ciliate. Inferior *petal* glabrous, the rest bearded. *Spur* short, obtuse.

Var. Ovata. *Leaves* ovate, somewhat cordate; petiole margined.

Var. Exarginata. Glabrous; *leaves* almost triangular, lacerately toothed near the base.

Pale blue. 4. March & April. Upper districts of Geo. & Car. 6–8 in.

6. V. Villosa. *Leaves* cordate, obtuse, pubescent, appressed, toothed, with purple veins. *Sepals* acute, or obtuse. *Petals* villous, lateral ones bearded.

Pale blue. 4. March and April. Sandy soil, common.

7. V. Rotundifolia. *Leaves* orbicular, cordate, somewhat crenate, glabrous. *Petiole* pubescent. *Sepals* obtuse. *Petals* sometimes emarginate, upper ones stand, marked with a few brown lines. *Spur* short.

Yellow. 4. May. Mountains.

8. V. Primulæfolia. *Leaves* oblong, somewhat cordate, serrate. *Petioles* membranous. *Petals* entire, green at the base, lateral ones bearded. *Stigma* capitate, margined.

White. 4. Feb. to April. Common. 2–3 inches.

9. V. Lanceolata. *Leaves* lanceolate, narrow, glabrous, attenuate at the base into a long petiole, obtuse, cuneate. *Peduncles* reddish, of the length of the leaves: divisions of the calyx lanceolate, acute. *Petals* entire, green at the base, the upper one marked with blue lines; all beardless.

White. 4. April—May. Damp places. 3–8 inches.

(b.) with stems. Stigma convex, not margined.

10. V. Stricta. *Stem* erect, glabrous, nearly terete, branching. *Leaves* roundish, cordate, acute, serrate, with conspicuous stipules, ciliate. *Sepals*

lanceolate acuminate, ciliate. *Petals* entire, upper one marked with blue lines, naked, glabrous, lateral ones bearded. *Stigma* tubular recurved

Yellowish-white. 4. April—May. Common in moist places. 6–12 in.

11. V. Muhlenbergii. *Stem* glabrous, terete, weak, assurgent or prostrate. *Leaves* reniform-cordate, upper ones ovate, cruciate. *Stipules* lanceolate, sub-pinnate, serrate, ciliate. *Sepals* linear, acute, sub-ciliate. *Petals* without veins, lateral ones bearded, and with the upper one marked with blue lines. *Stigma* tubular papillose.

Bluish-purple. 4. May. Moist places. 6–10 inches.

12. V. Hastata. *Stem* simple, leafy at the summit, nearly glabrous. *Leaves* alternate hastate, with obtuse lobes, and deltoid-lanceolate, slightly serrate, on short petioles. *Stipules* ovate dentate. *Sepals* lance-linear; lateral petals slightly bearded. *Stigma* hairy on each side, with a furrow on the top.

Yellow. 4. May. Upper districts of Georgia. First discovered by Dr. James Green. 6–12 inches.

13. V. Tripartita. *Stem* hirsute, simple, leafy only at the summit. *Leaves* deeply 3-parted, the lobes lanceolate, dentate, very hairy, sometimes ternate. *Stipules* villous, lanceolate. *Peduncles* long with 2-minute, alternate scales near the middle. *Sepals* acute. The upper petal streaked with purple.

Yellow. 4. March—April. Upper districts of Geo. 8–12 inches.

14. V. Pubescens. *Stem* terete erect, villous naked below. *Leaves* broad ovate, cordate, dentate, on short petioles. *Stipules* large, ovate, dentate. *Sepals* lanceolate. *Petals* striate, lateral ones bearded. *Stigma* globose, strongly bearded on each side.

Yellow. 4. April—May. Common. 6–12 inches.

15. V. Canadensis. *Stem* erect, terete, nearly glabrous. *Leaves* broadly cordate, acuminate serrate, nerves pubescent. *Stipules* entire membranaceous, oblong, sub-ovate. *Sepals* subulate, entire. *Petals* entire, veined, upper one broad expanding, lateral ones bearded, spur short, saccate. *Stigma* short, pubescent. *Flowers* odorous.

Different petals white, yellow and violet. 4. May. Woods. 6 in. 2 ft.

(c.) with stems, stigma urceolate, hairy on each side.

16. V. Arvensis. *Stem* angled, furrowed, glabrous. *Leaves* spatulate, ovate, lower ones nearly orbicular. *Stipules* pinnatifid. *Sepals* ciliate about equal in length to the petals. *Petals* with the lateral ones bearded.

Yellowish-blue, spotted with purple. ☺. May. Middle Geo. 10–12 in.

Remarks.—The plants of this genus have been object of regard in all ages, and the *hearts ease* is much and justly esteemed for its modest beauty. The *palmata* particularly is very mucilaginous, and is used by the negroes in their soups. The roots are all emetics, and the roots of plants belonging to this order, are met with in commerce as Ipecacuanha.

Genus II. SOLEA.

Sepals 5, nearly equal, not auricled. *Flowers* irregular, the lowest petal 2-lobed, and somewhat gibbous at the base, the others emarginate. *Stamens* cohering; the two lowest bearing a gland above the middle. *Stigma* uncinate. *Capsule* 3-sided, surrounded at the base by a concave torus. *Seeds* 6–8 large.

1. S. Concolor. *Stem* simple, leafy. *Leaves* oblong, lanceolate, somewhat erect, attenuated at each extremity. Lowest *petal* twice as long as the others. *Stigma* hooked, perforate. *Spur* short.

Greenish. 4. July—August. Mountains of Carolina. Near Table Rock. 1—2 feet.

Remarks.—We have followed the latest writers in placing this plant in a different order from Viola, but we are unable to say why it should thus be placed.

Order XVI. DROSERACEÆ.

Sepals 5, persistent, equal, æstivation imbricate. *Petals* 5, hypogynous, marcescent. *Stamens* 5–10–15, distinct, marcescent, filaments capillary, or flattened, anthers extrorse, innate. *Fruit* a capsule, 1-celled, 3–5-valved with parietal placentæ, many seeded local/central. *Styles* 2–5, distinct, or connected at the base, each 2-parted or branched. *Seeds* anatropous. Herbaceous plants, generally glandular. *Leaves* alternate with circinate vernation.

Genus I. DROSERA.

Sepals 5. *Petals* 5. *Stamens* 5. *Styles* 3–5, each 2-parted or multifid. *Capsule* 3–5-valved, valves placentiferous to the summit. *Seed* numerous in several rows on each placenta: small herbs growing in wet places. *Leaves* bearing glandular hairs.

1. D. Rotundifolia. Without stem. *Leaves* orbicular, spreading, tapering at the base. *Petiole* long, hairy, appressed to the ground, covered with glandular hairs, ruddy. *Scape* 5–10 flowered, with the calyx and scape of nearly the same color as the leaves. *Sun-dew.*

White. ☉. April. Common in shaded spots. 4–10 in.

2. D. Longifolia. *Stem* terete, ascending or decumbent, spatulate, oblong, erect, attenuate into a long naked petiole. *Scape* declined at the base. *Petals* short. *Style* very short.

White. 4. June—Aug. Swamps of the middle and low country of Ga. 3–8 in.

3. D. Filiformis. *Leaves* forming a dense tuft, not more than an inch in diameter, usually circinate, obtuse. *Petals* obovate, more than twice the length of the calyx. 2–8-flowers in a scape. *Scape* filiform. *Styles* deeply 2-parted.

Rose-color. 4. June. Florida. 3–8 inches.

4. D. Filiformis. *Leaves* long, 6–10-inches, filiform, nearly erect, glandular hairy, petiole naked. *Scape* sub-ramose, terete, glabrous, 8–20-flowered. *Petals* obovate, crosely denticulate, much longer than the calyx. *Styles* 2-parted to the base.

Nearly white. 4. Aug.—Sept. Florida. 12–15 inches.

Genus II. DIONÆA.

Stamens 10–15. *Stigma* fimbriate. *Capsule* 2-celled, many seeded, gibbous.

1. D. Muscipula. Without stem. *Leaves* spreading. *Petiole* winged, foliaceous. lamina articulated to the petiole, circular, armed with stiff, spine-like cilia, very sensitive, when touched, it closes up with considerable force. *Scape* about 10-flowered. *Venus' Fly Trap.*

White. 4. April—May. North and South Carolina, on the Cape Fear and Santee rivers: in turfy sandy bogs. 6–12 inches.

Remarks.—This is a most interesting plant. The "sensitiveness of its lamina," is

said to reside by the Rev. M. A. Curtis, "in only three or four hair-like processes of its upper surface, so placed that an insect can hardly traverse it without interfering with one of them, when the two sides suddenly colapse and enclose the prey, the fringe or hairs of the opposite sides of the leaf interlacing like the fingers of two hands clasped together." The circumscribed geographical section in which the plant has been found is remarkable. This plant is found only in the section above indicated, nor has this or any other species of the genus been found in any other quarter of the globe.

Genus III. PARNASSIA.

Sepals 5, more or less united, æstivation imbricate, united to the ovary at the base. *Petals* 5, nearly perigynous, persistent. *Stamens* 5, perigynous, alternate with the petals, with an indefinite number of ovate sterile stamens united into 5 phalanges opposite the petals; these probably consist of two series accounting for their being opposite the petals. Perrenial herbs, growing in wet places.

1. P. Caroliniana. *Leaves* orbicular-ovate, or broad cordate, entire, glabrous, 5–7-nerved on long petioles, 2–8-inches rather coriaceous. Cauline leaves low down, clasping. *Stem*, 1-flowered. *Sepals* small 5-united at the base, oval, 3-ribbed, with a membranaceous margin. *Petals* oval or ovate, with 5–7 green nerves. *Sterile* filaments in 5 bunches, each composed of 3 filaments, distinct nearly to the base about the length of the stamens, terminated by an awn. *Anthers* sagittate. *Styles* 4, short.
White. 4. July—Aug. Near Columbia S. C. 10–20 inches.

2. P. Asarifolia. *Leaves* reniform, the cauline one, nearly orbicular, slightly cordate, sessile. *Petals* ovate, broad, obtuse, unguiculate; sterile filaments separate nearly to the base, united by threes. *Leaves* and flowers larger than in the preceeding *species*.
White. 4. July—August. Mountains. 1–2 feet.

Order XVIII. CISTACEÆ.

Sepals 5, persistent, unequal, the ovate smallest or wanting, the 3-inner with an imbricate and sometimes twisted æstivation. *Petals* 5, hypogynous, fugitive, twisted in an opposite direction from the sepals. *Stamens* indefinite, hypogynous, distinct. *Anthers* short, innate. *Ovary* a 3–5-valved, 1-celled capsule, with a loculicidal dehiscence, or with the membranes bearing the placentæ extending nearly to the center making it imperfectly 3-celled, and in the *Lechea* called 3-celled. *Seeds* 3 to many, orthotropous. *Perennial* herbaceous plants. *Flowers* of the whole order yellow.

Genus I. HELIANTHEMUM.

Sepals 5, unequal, the two exterior small, bract-like, and sometimes wanting. *Petals* 5, fugitive or occasionally wanting. *Stigmas* 3, large, more or less united into one. *Capsule* 3-valved, few or many seeded, triangular. *Sun rose.*

1. H. Canadensis. *Stem* erect, at first simple, afterwards branched, bran-

es hairy. *Leaves* oblong-lanceolate, acute, hairy, pale beneath, margins revolute. *Flowers* of the stem few or solitary, terminal, large; of the branches axillary, small, nearly sessile, with very small or no petals. *Petals* erosely emarginate, double the length of the sepals.

Yellow. 4. May—June. In dry soils. Middle Geo. & Car. 6-18 in.

2 H. Corymbosum. *Stem* branching, covered with stellular pubescence. *Leaves* oblong-lanceolate, canescent beneath. *Flowers* in terminal, corymbose cymes. *Petals* twice the length of the calyx; secondary flowers mostly apetalous. *Sepals* villous, the two exterior long and linear.

Yellow. 4. April—May. Dry soils on the coast of Car. & Geo. 10-15 in.

3. H. Carolinianum. *Stem* erect, hirsute, generally purple. *Leaves* nearly sessile obovate, slightly denticulate, villous when young, crowded near the base of the stem, sometimes nearly orbicular. *Flowers* near the summit of the stem, few, large. *Sepals*, the two exterior linear, expanding; the three interior larger, ovate lanceolate, acuminate. *Petals* twice as long as the calyx. *Stamens* numerous, unequal. *Seeds* numerous.

Yellow. 4. May—June. Dry soils, Geo. & Car. 6-12 inches.

Remarks.—This is a beautiful genus of flowering plants, of which Europe produces more than 40 species, while North America produces only 5. We know not, that our indigenous species are cultivated but well deserve it, beyond that of many imported plants.

Genus II. LECHEA.

Sepals 5, the two exterior narrow and bract like. *Petals* 3, minute, lanceolate. *Stamens* 3-12. *Stigmas* 3, on short, somewhat united *style*, fimbriate. *Capsule* 3-valved, apparently 3-celled, with roundish placentæ, nearly as broad as the valves, about 2-seeded. Perennial herbs.

1. L. Major. *Stem* herbaceous, branching, scabrous, young branches, villous, radical branches tufted. *Leaves* ovate lanceolate, those on the radical branches opposite, and sometimes nearly round on the stem, alternate. *Flowers* in lateral racemes, with short pedicels. *Capsule* somewhat 3 sided, depressed. *Petals* lanceolate, obtuse. *Anthers* bi-locular, pink.

White. 4. July—Aug. Sandy soils, common. 1-2 ft.

2. L. Minor. *Stem* erect, branching, pubescent: radical branches, if any, hairy. *Leaves* linear-lanceolate, scattered, or occasionally nearly verticillat *Flowers* in terminal panicles, with oppressed pedicels.

Var. Racemulosa. *Stem* much branched near the summit, with seldom any radical branches. *Leaves* small, narrow.

Var. Tyrnifolia. *Stem* decumbent and assurgent, very much branched, somewhat hairy. *Leaves* subulate, linear. *Flowers* solitary, at the extremities of the branches.

White. 4. Sandy soils, in middle Car. 6-18 inches.

3. L. Thymifolia. *Stem* frutescent, decumbent at the base, much branched above, hoary-villous. *Leaves* linear, acute, numerous, those of the procumbent radical branches small, imbricate, elliptical. *Flowers* 2-6 at the extremities of the branches, in leafy panicles. *Calyx* tomentose.

White. 4. Sandy soils. May—Aug. 10-15 in.

Order XIX. HYPERICACEÆ.

Sepals 4-5, cohering at the base, or distinct, persistent, unequal, æstivation imbricate. *Petals* hypogynous, as many as the sepals, veins oblique, with a twisted æstivation. *Stamens* hypogynous, usually very numerous, polydelphous, usually in three parcels. *Anthers* versatile introrse. *Ovary* composed

of 2–5 united carpels. *Styles* several, persistent. *Capsule* with a septicidal dehiscence, 1–2–5 celled; when 1-celled the placentæ parietal; when more than 1-celled, the placentæ central. *Seeds* very numerous, anatropous. *Embryo* straight, cylindrical. Herbs and shrubs. *Leaves* opposite entire, without stipules, dotted.

Genus I. ASCYRUM.

Sepals 4, the two exterior usually broad and foliaceous, the two interior smaller. *Petals* 4. *Stamens* usually united by their filaments into four parcels. *Capsule* oblong, 1-celled, 2-valved, with parietal placentæ. *Styles* 2–3, occasionally united. Shrubby, or suffructicose. *Leaves* with black dots.—*Flowers* yellow.

1. A. Crux-Andreæ. *Stem* erect, much branched spreading. *Leaves* oblong-lanceolate, obtuse, sessile, dotted, small. *Flowers* solitary, axillary, and terminal. The outer sepals, cordate, ovate, acute; the interior small, 2 small bracteal leaves at the base of the calyx. *Petals* linear-oblong. *Styles* 2. *Stigmas* single. *Capsule* 2-valved, compressed. *St. Andrew's Cross.*
Yellow. ♃. July. Pine woods. Car. & Geo. 8–12 inches.

2. A. Pumilum. *Stem* prostrate, much divided, slightly winged. *Leaves* linear-oval, small, obtuse, *toothed*, perennial. *Flowers* solitary, axillary; exterior sepals ovate, acute, marked with dots. *Petals* ob-ovate, a little longer than the calyx. *Stamens* numerous, not distinctly united into parcels. *Style* 1, long. *Capsule* ovate. A variable plant.
Yellow. ♃. March. Pine barrens, Middle Geo. 6–10 inches.

3. A. Hypericoides. *Stem* erect sparingly dichotomous, branched, ancipital, slightly winged. *Leaves* sessile, opposite, somewhat clasping, oblong, obtuse, glaucous. *Flowers* terminal or axillary on erect peduncles, exterior, sepals large, cordate-ovate, nearly orbicular, nerved dotted. *Petals* obovate. *Stamens* very numerous. *Styles* 2. *Capsule* triangular. *Seeds* striate.
Yellow. ♄. Through the summer. Damp soils.

4. A. Amplexicaule. *Stem* erect, sparingly branched, branches ancipital. *Leaves* broadly ovate, oblong, cordate, clasping. *Flowers* erect; exterior sepals cordate, broad. *Petals* obovate. *Stamens* very numerous. *Styles* 3.
Yellow. ♃. Through the summer. Southern Geo. & Florida. 1–2 ft.

5. A. Microsepalum. *Stem* nearly terete, much branched. *Leaves* very small, oblong-linear, crowded. *Flowers* erect, on long peduncles, large, clustered at the summit of the branches. *Sepals* nearly equal in length; the exterior ones about a third broader than the others. *Petals* more than twice as long as the sepals, one of them usually much shorter than the others. *Styles* filiform, long. Torrey & Gray.
Yellow. March—April. Middle Florida. A foot or more high.

Genus II. HYPERICUM.

Sepals 5, united at the base, foliaceous. *Petals* 5, oblique. *Stamens* numerous united at the base into 3–5 parcels. *Pistils* 3–5, persistent. *Capsule* 1-celled, with parietal placentæ, or 3–5-celled

1. H. Prolificum. *Stem* shrubby or suffructicose, with dichotomous, an-

ipital branches. *Leaves* narrow lanceolate. *Sepals* foliaceous, ovate lanceolate, acuminate. *Petals* obovate longer than the sepals. *Capsules* 3-celled, ovate-oblong.

Yellow. ☿. June. Middle Geo. & Car. 2–3 feet.

2. H. Gallicum. *Stem* erect, slender. *Leaves* fasciculate, linear-lanceolate, narrowed at the base, *margin* revolute, dotted. *Flowers* axillary terminal. *Sepals* linear, reflexed when mature. *Petals* obovate, with a tooth near the summit. *Stamens* numerous, scarcely divided into parcels. *Pistils* 3.

Yellow. ☿. June—Aug. Wet places. Geo. Car. & Fa. 2–3 feet.

3. H. Fasciculatum. *Stem* branching, branches angled. *Leaves* linear, numerous, crowded, sessile, revolute, dotted. *Flowers* axillary, near the summit. *Sepals* linear resembling the leaves. *Petals* oblong, ovate, toothed like the preceding. *Filaments* slightly cohering into parcels. *Pistils* 3, united. *Capsule* 3-celled 3-valved.

Yellow. ☿. June—Aug. Pine barrens. 1–2 feet.

4. H. Adpressum. Amœnum. *Stem* much branched, branches ancipital. *Leaves* oval, oblong, with slightly undulated margin, glaucous beneath. *Flowers* axillary, solitary. *Sepals* ovate, acute. *Petals* ovate reflexed. *Stamens* very numerous. *Styles* 3, separating as the fruit matures.

Golden Hypericum.

Yellow. ☿. June—August On the Ocmulgee, one mile above Macon. 2–3 feet.

5. H. Marifolium, Glaucum. *Stem* terete, with a few branches near the summit. *Leaves* cordate-ovate, obtuse, clasping, glaucous, dotted coriaceous. *Flowers* in fasciculate cymes, leafy. *Sepals* ovate, reflexed. *Petals* about as long as the sepals, with a tooth near the summit. *Stamens* numerous nearly as long as the petals. *Styles* 3, at first united but separating as the fruit matures.

Yellow. ☿. May—June. Wet places. Middle Geo. 18–24 inches.

6. H. Aspalathum. *Stem* with numerous ancipital, opposite branches, with reddish bark. *Leaves* linear-lanceolate, acute, thin, mucronate, with a white spot. *Flowers* axillary and terminal, near the summits of the branches. *Sepals* unequal, lanceolate, attenuate at the base. *Petals* oblique, obovate, with a tooth near the summit. *Styles* united. *Capsule* 3-celled.

Yellow. ☿. May—June. On the Congaree, near Columbia, 2–4 ft.

7. H. Myrtifolium. *Stem* branching; branches angled and winged. *Leaves* sessile, oblong-ovate, obtuse, punctate with reddish dots, pale. *Flowers* in a dichotomous panicle. *Sepals* lanceolate, oblong or linear. *Petals* obovate, double the length of the calyx. *Styles* 3, united at the base. *Capsule* 3-celled.

Yellow. ☿. Aug.—Sept. Swamps. Car. & Geo. 1–2 feet.

8. H. Crux-Andreæ. *Stem* slender, with few opposite slender branches, nearly square, winged. *Leaves* narrow, oblong, sessile, punctate with minute brown dots, thick, somewhat coriaceous. *Flowers* in a naked cyme. *Sepals* oblong, or obovate, unequal. *Petals* very oblique, double the length of the sepals. *Pistils* 3, united.

Yellow. ☿. July—Aug. Near Macon. 18–24 inches.

9. H. Fasciculatum. *Stem* branching, branches ancipital. *Leaves* long narrow-lanceolate, acute, connate, tapering at the base, dotted, glaucous on the under surface. *Flowers* in corymbs, with solitary flowers in the lower divisions of the corymbs. *Sepals* lanceolate, half the length of the petals. *Styles* united, not separating with the maturing of the fruit.

Yellow. ☿. June—July. Low country, pine woods. 2–3 feet.

10. H. Maculatum. *Stem* terete, glaucous, erect, the whole plant dotted with black. *Leaves* cordate-oblong, and oval, clasping. *Flowers* numerous in a compound panicle. *Sepals* lanceolate, united at the base, dentate. *Petals* obovate-oblong, double the length of the calyx. *Stamens* numerous. *Pistils* 3, longer than the stamens. *Stigmas* purple. *Capsule* 3-celled, 3-valved.

Yellow. ♃. May—August. Dry soils. Geo. & Car. 2–2½ feet.

11. H. Pilosum, Simplex. *Stem* terete, erect, virgate, tomentose. *Leaves* ovate-lanceolate, sessile, appressed, dotted, acute, amplexicaule. *Flowers* in panicles. *Sepals* unequal, ovate-lanceolate. *Petals* oblong. *Styles* 3. *Capsule* 1-celled.

Yellow. ☺. June—Sept. Common in the middle country, in wet places. 1-2 feet.

12. H. Angulosum. *Stem* erect, angled, branching towards the summit. *Leaves* oblong-lanceolate, sessile, amplexicaule, dotted, appressed. *Flowers* in a loose panicle, frequently in the divisions of the stem. *Sepals* united at the base, unequal, ovate, acute. *Petals*, obovate, with a tooth near the summit. *Pistils* 3. *Capsule* 3-valved, 1-celled.

Yellow. ♃. May—Aug. Wet places, 12--24 inches.

13. H. Parviflorum, Mutilum. *Stem* erect, branching, glabrous, 4-angled. *Leaves* ovate-oblong, clasping, punctate. *Flowers* in the divisions of the stem. *Sepals* lanceolate. *Petals* oblong. *Stamens* 10–20 longer than the corolla. *Pistils* 3, expanding. *Capsule* 1-celled, 3-valved.

Yellow. ☺. July—Sept. Wet grounds, common. 1–2 ft.

14. H. Canadense. *Stem* slightly angled, dichotomous towards the summit. *Leaves* linear, sessile, tapering at the base, dotted. *Sepals* lanceolate, acute. *Petals* shorter than the sepals, oblong. *Pistils* 4--5, stigmas capitate, capsule of a dull red color.

Yellow. ☺. June—Aug. Common in wet places. 6--12 inches.

15. H. Sarothra. *Stem* erect, branching from the base, filiform, quadrangular. *Leaves* subulate, minute, opposite, appressed. *Flowers* minute, solitary, axillary. *Sepals* linear lanceolate. *Petals* oblong, linear, longer than the calyx. *Stamens* 5. *Pistils* 3, spreading, stigmas capitate. *Capsule* 1-celled, 3-valved, purple. *Sarothra Gentianoides of Elliott.*

Yellow. ☺. June—Aug. Common. 8--12 inches.

16. H. Drummondii. *Stem* branching, terete below, quadrangular above branches generally alternate. *Leaves* linear, acute, dotted. *Sepals* unequal, lanceolate. *Petals* oblong longer than the sepals. *Stamens* 10--20. *Pistils* 3. *Capsule* 1-celled, 3-valved. *Seeds* ribbed. *Sarothra Drummondii.*

Yellow. ☺. July—Sept. Middle Geo. 10- 18 inches.

Remarks.---We are not aware, with one exception, that the hypericums are used for any other purpose than ornament. Some of them bear elegant flowers. The *H. Amoenum* bears a splendid flower, of the richest golden yellow, it has been gathered from the banks of our streams and transferred to gardens, and it is hardly surpassed by any exotics, in its claims on the florists attention. The *H. Perforatum* an introduced species, and which covers fields in the Northern and Middle States, has long enjoyed considerable reputation in the cure of diseases, but with the faculty we believe it is pretty much abandoned, but still retains a place among the housewife's herbs. It is astringent and possesses no doubt, some of the properties of the turpentine. It is used for burns and bruises, in pectoral complaints, jaundice, and as a vermifuge.

Genus. III. ELODEA.

Sepals 5, united at the base. *Petals* 5, unguiculate. *Stamens* 9–15, united into three parcels, with an intervening gland. *Pistils* 3, distinct, spreading. *Capsule* 3-celled, 3-valved.

1. E. Virginica. *Stem* glabrous, terete, with opposite branches. *Leaves* opposite, oblong, sessile, clasping, glaucous underneath. *Flowers* in axillary and terminal cymes, axillary ones about 3-flowered, terminal ones more numerous. *Sepals* oval, nerved, not dotted, glabrous. *Petals* oval or obovate-oblong, marked with reddish veins. *Stamens* usually 9.

Orange purple. ♃. Aug.—Sept. Wet soils. 18--24 inches.

2. E. Petiolata. *Stem* glabrous. *Leaves* petiolate, attenuated at the base, oblong-oval. *Flowers* opposite by threes. *Stamens* united above the middle. *Sepals* oval, obtuse, with membranaceous margins. *Petals* lanceolate, a little longer than the calyx. *Stamens* 9, in three parcels. *Capsule* 3-celled.

Orange purple. ♃. Aug.—Sept. Around ponds and ditches. 2--2½ ft.

Order XX. ILLECEBRACEÆ.

Sepals 5, persistent, distinct or united at the base. *Petals* 5 or none, alternate with the sepals, minute, sometimes resembling sterile filaments. *Stamens* equal in number to the sepals, and opposite them, perigynous, filaments distinct, anthers 2-celled. *Ovary* compressed, of several carpellæ with the dissepiments obliterated, so as to form a pyxidium, with central placentæ one or many seeded. *Seeds* campulitropous. *Embryo* more or less curved. *Herbaceous* plants, with opposite, entire leaves, with scabrous stipules.

Genus I. PARONYCHIA. (*Anychia.*)

Sepals united at the base, cuspidate or curved at the summit; the inner portion colored, cucullate or concave at the summit. *Petals* resembling sterile filaments, very minute or wanting. *Stamens* 5, inserted into the edge of the disk that lines the base of the sepals. *Stigmas* 2. *Styles* more or less united. *Pyxidium* inclosed in the sepals.

1. P. Dichotoma. *Stem* branching from a thick woody base, glabrous. *Leaves* opposite, subulate, mucronate, dotted; with 4 stipules at each joint. *Flowers* in dichotomous cymes, diffuse. *Sepals* yellowish, linear, 3-ribbed, lined with a whitish disk. *Style* filiform, cleft about one fourth its length.
   ♃. July—Nov. North & South Carolina. Texas. 6–12 inches.

2. P. Argyrocoma. *Root* fusiform. *Stem*, terete, jointed, branching, dichotomous, glabrous towards the summit. *Leaves* linear, acute, slightly hairy with 2 stipules sometimes 4, longer than the joints. *Flowers* in glomerate cymes. *Sepals* linear, hairy, setaceously cuspidate, the inner portion bearded above.
   ♃. August. Mountains. 4–10 inches.

3. P. Hernariodes. *Stem* diffusely branched, prostrate. *Leaves* sessile, oblong-oval, ciliate, mucronate. *Flowers* sessile in the axils of the leaves. *Sepals* subulate, mucronate, expanding. *Stipules* longer than the leaves.
   ♃. Upper districts of South Carolina and Georgia.

Genus II. ANYCHIA.

Sepals ovate oblong, united at the base, slightly concave, subsaccate at the apex, sub-mucronate on the back. *Corolla* none. *Stamens* 2–5 inserted on the base of the sepals. *Pistils* very short, 2. *Styles* distinct or united. *Annual* plants, dichotomously divided.

1. A. Canadensis. *Stem* erect or decumbent at the base, much branched at the summit, dichotomous, pubescent. *Leaves* opposite, nearly glabrous, sessile, dotted. *Stipules* generally four at each joint, membranous. *Flowers* solitary and terminal on each branch. *Sepals* somewhat hooded at the point. *Stamens* commonly 3, shorter than the calyx. *Stigmas* 2.
   ☉. July—Aug. Upper districts of Car. & Geo. 4–10 inches.

2. A. Baldwinii. *Stem* decumbent, diffuse, branching from the base. *Leaves* lanceolate, acute. *Stamens* 5. *Styles* distinct nearly to the base.
   ☉. Middle Florida.

Genus III. SIPHONYCHIA. (*Herniaria.*)

Sepals 5, cohering below into a tube, petaloid above, concave at the summit. *Petals* none, or subulate, filament like the petals inserted into the tube of the calyx. *Stamens* 5. *Style* filiform, about the length of the calyx.

1. S. Americana. *Stem* branching, diffuse, procumbent, minutely and retorsely puberulent. *Leaves*, oblong-lanceolate, ciliate, slightly hairy beneath, shorter near the summit. *Flowers* in glomerate cymes, at the extremities of the branches, numerous. *Sepals* white above, minutely hispid with hooked bristles at the base.
⊙. July—August. Middle Georgia.

Genus IV. STIPULICIDA.

Sepals 5, united at the base, or separate. *Petals* 5, narrow, oblong, cuneate. *Stamens* 3. *Pistils* 3 with short styles. *Capsule* 3-valved, many seeded.

1. S. Setacea. *Stem* erect, dichotomous, setaceous. *Leaves* near the root opposite, spatulate, petiolate, of the stem small, setaceous. *Stipules* multifid. *Flowers* minute, in small terminal fascicles.
White. ⊙. May. Middle Geo. Common. 6–10 inches.

Genus V. POLYCARPON.

Sepals 5, distinct, ovate, acuminate, keeled, unequal. *Petals* 5, linear, emarginate, shorter than the sepals, persistent. *Stamens* 3, longer than the corolla. *Pistils* 3, styles united, short. *Capsule* 3-valved, 1-celled, many seeded.

1. P. Tetrophyllum. *Stem* ascending, much branched, glabrous, striate, knotted. *Leaves* opposite and by fours, obovate, obtuse, glabrous, entire, narrowed at the base; several membranous stipules at each joint. *Flowers* in corymbose panicles, dichotomous with a flower in each division. *Petals* much shorter than the sepals.
White. ⊙. May—June. Charleston. Introduced. 3–6 inches.

Genus VI. SPERGULA.

Sepals 5, distinct. *Petals* 5, entire. *Stamens* 5–10, sometimes only 2, inserted with the petals. *Pistils* 3–5. *Capsule* 3–5 valved, many seeded. *Seeds* compressed, orbicular or reniform.

1. S. Arvensis. *Stem* erect, glabrous. *Leaves* verticillate, subulate-linear, numerous at each joint. *Flowers* in dichotomous panicles, with a flower in each division. *Petals* longer than the sepals. *Pistils* 5. *Seeds* margined.
White. ⊙. May—August. Common. 10–12 inches.

2. S. Decumbens. *Stem* branching, decumbent. *Leaves* linear subulate, glabrous, opposite, connected by a stipular membrane. *Flowers*, on solitary or axillary peduncles. *Sepals* persistent. *Petals* oblong, obtuse, persistent. *Stamens* 10, as long as the calyx. *Stigmas* 5, nearly sessile. *Seeds* small.
White. ⊙. March—April. Common. 1–4 inches.

3. S. Rubra. (*Arenaria Rubra. A. Canadensis.*) *Stem* much branched, glabrous, procumbent and assurgent, succulent. *Leaves* linear subulate, fleshy, mucronate. *Stipules* ovate, cleft, membranaceous. *Flowers* axillary, solitary. *Sepals* lanceolate, with membranaceous margins. *Petals* lanceolate. *Stamens* variable, 2–10. *Stigmas* glandular.

Pale rose color. ☉. April—May. Salt marshes. 3–6 inches.

Order XXI. CARYOPHYLLACEÆ.

Sepals 4–5 distinct or united at the base into a tube, persistent. *Petals* 4–5 hypogynous, unguiculate, inserted on the pedicel of the ovary, or destitute of claws and inserted on a nearly perigynous disk. *Stamens* generally twice as many as the petals and inserted with them. *Filaments* sometimes cohering. *Ovary* stipitate. *Pistils* 2–5, with the stigmatic surface extending the whole length. *Capsule* 2–5 valved, 1-celled rarely 2–5 celled, dehiscence loculicidal, or by the apex, by the capsule splitting into twice as many teeth as stigmas, with a central placenta. *Seeds* campulitropous. *Herbs*, with tumid nodes. *Leaves* opposite.

Genus I. SAGINA.

1. S. Procumbens. *Stem* procumbent, glabrous. *Leaves* linear, clustered at the extremity of the branches. *Flowers* on solitary, axillary peduncles. *Petals* about half the length of the sepals, or none.

Barren fields. South Carolina. 2–4 inches.

Genus II. ARENARIA.

Sepals 5, expanding. *Petals* 5, entire. *Stamens* almost always 10. *Pistils* 3. *Capsule* 3 valved, 1-celled, many seeded.

1. A. Serpyllifolia. *Stem* diffuse, dichotomously divided, retrorsely pubescent. *Leaves* ovate, ciliate. *Flowers* axillary, or in the divisions of the stem, solitary. *Sepals* hairy, acuminate, lanceolate, somewhat unequal. *Petals* oval, erect, shorter than the sepals. *Stamens* unequal, shorter than the calyx. *Stigmas* 3, simple.

White. ☉. April—May. Common in dry pastures. 3–6 inches.

2. A. Squarrosa. *Stem* much divided near the base, glandular pubescent. *Leaves* short, subulate, the lower ones densely squarrose-imbricate, rather obtuse, upper ones few. *Flowers* in terminal panicles, few flowered. *Sepals* ovate, obtuse without nerves. *Petals* obovate, three times as long as the sepals.

White. ♃. April—June. Sand-hills, common. 6–10 inches.

3. A. Stricta. *Stems* diffusely-cæspitose, glabrous, branched from the base. *Leaves* subulate, linear, erect, 1-nerved, fascicled in the axils. *Flowers* in a few flowered panicle. *Sepals* ovate, rigid, 3-ribbed. *Petals* oblong-ovate longer than the sepals.

White. ♃. May—June. Mountains. 4–6 inches.

4. A. Glabra. *Stems* filiform, decumbent at the base, cæspitose, glabrous. *Leaves* linear, spreading, almost setaceous. *Flowers* 8–12. *Sepals*

oval, obtuse, membranaceously margined, nerveless. *Petals* obovate-oblong, twice the length of the sepals.

White, ☺. June—July. Mountains. 4–6 inches.

Genus III. STELLARIA.

Sepals 5, expanding, somewhat united at the base. *Petals* 5, two parted, often perigynous. *Stamens* 10, or fewer by suppression. *Pistils* 3 or rarely 4. *Capsules* 3-valved, 1-celled, many seeded. *Chickweed.*

1. S. Media. *Stem* procumbent, with an alternate pubescent line. *Leaves* ovate, glabrous. *Flowers* terminal or axillary. *Sepals* hairy. *Petal* oblong, deeply divided, hypogynous. *Stamens* 3--10. *Pistils* 3.

White. ☺. March—Oct. Common- 4--8 inches.

2. S. Prostrata. *Stem* procumbent, slightly channelled, fistulous, slightly pubescent. *Leaves* ovate, or cordate, acute, smooth, the lower ones on slender, ciliate petioles. *Flowers* solitary. *Sepals* erect ovate. *Petals* deeply divided, segments linear. *Stamens* usually 7.

White. ☺. March—April. Florida. 1- 4 feet long.

3. S. Pubera. *Stems* decumbent, with two opposite pubescent lines. *Leaves* sessile, ovate, ciliate. *Flowers* axillary, solitary. *Sepals* with membranaceous margin. *Petals* deeply divided, longer than the sepals. *Stamens* 10. *Pistils* 3.

White. May. In rich soils. 6--12 inches.

4. S. Uniflora. (*Arenaria Glabra of Ell.*) *Stem* branching, glabrous, erect, slender. *Leaves* subulate, acute, slightly connate. *Flowers* on filiform, axillary peduncles. *Sepals* oblong, persistent. *Petals* ob-cordate, emarginate, twice the length of the sepals.

White. ☺. May. In the low country, swamps. 10--12 inches.

5. S. Lanuginosa. (*Arenaria Diffusa of Ell.*) *Stem* branching, diffuse, decumbent. *Leaves* oblong-lanceolate, acute, alternate at the base. *Flowers* on solitary, axillary, 1-flowered peduncles. *Sepals* ovate, acute, persistent. *Petals* oval very small, or entirely wanting.

White. ☺. April—June. Damp soils. 2–3 feet long, supporting itself on small plants.

Genus IV. CERASTIUM.

Sepals 5, somewhat united at the base. *Petals* 5, 2-cleft, or emarginate. *Stamens* 10, seldom a less number. *Pistils* 5. *Capsules* 1-celled, 5-valved, dehiscing at the apex, producing 10, rarely 5 teeth, many seeded. *Chickweed.*

1. C. Vulgatum, C. Hirsutum of Ell. *Stem* procumbent, branching, fistulous, hirsute. *Leaves* ovate or obovate, obtuse, connate. *Flowers* in dichotomous panicles with a flower in each division. *Sepals* persistent, with membranaceous margin. *Petals* oblong, expanding, double the length of the sepals. *Stamens* unequal. *Styles* short. *Stigmas* glandular.

White. ☺. April—Sept. Very common. 6--12 inches.

2. C. Viscosum. *Stem* hirsute and viscid, diffuse. *Leaves* lanceolate-oblong, obtuse. *Flowers* in a loose cyme. *Petals* obovate, scarcely longer than the calyx. *Capsule* nearly twice as long as the calyx.

White. ♃. May—Sept. Old pastures, common.

3. C. Arvense. *Stems* declined at the base, retrorsely pubescent. *Leaves* linear or linear-lanceolate, acute. *Flowers* few on an elongated peduncle. *Sepals* obtuse half the length of the petals. *Petals* ob-cordate.

White. ♃. May—July. Rocky places. 2- 8 inches.

Genus V. SILENE.

Sepals 5, united into a tube. *Petals* 5, unguiculate, with long claws, crowned at the summit of the claw, limb 2-cleft. *Stamens* 10, inserted on the stype of the ovary. *Pistils* 3. *Capsule* 3-celled, opening at the apex with 6 teeth.

1. S. Stellata. *Stem* erect, branching, minutely pubescent. *Leaves* verticillate by fours, broad-lanceolate, acute. *Flowers* in panicled cymes. *Petals*, fimbriate, not crowned.
White. ♃. Through the summer. So Ca. Dry woods. 2–3 feet.

2. S. Quinquevulnera. *Stem* divided from the base, hairy, hirsute. *Leaves* cuneate-oblong, obtuse, upper ones linear. *Flowers* in spikes. *Sepals* very villous. *Petals* with nearly round lamina, small, crown bifid.
Pink-color. ☉. July. On the coast. 8–12 inches.

3. S. Pennsylvanica. *Stem* viscidly pubescent, numerous from the same root. *Leaves* lanceolate acute, radical ones cuneate. *Flowers* in trichotomous panicles, terminal. *Calyx* tubular viscid, 5-cleft, slightly ventricose. *Claws* of the petals a little longer than the calyx, crowned with a 2-lobed leaflet. *Limb* erosely crenulate, emarginate.
White or rose color. ♃. April—June. Middle and low country. 8–10 in.

4. S. Virginica. *Stem* erect and generally simple, pubescent, viscid. *Leaves* of the stem oblong-lanceolate, radical ones spatulate, with ciliate petioles. *Calyx* slightly ventricose. *Petals* obovate deeply 2-cleft. *Stamens* exserted.
Bright crimson. ♃. June—July. On the coast. 12–18 inches.

5. S. Regia. *Stem* large, rigid, viscid, branched above, the lower nodes approximate swollen. *Leaves* ovate or ovate-lanceolate. *Flowers* many, in cymes. *Calyx* tubular long, 10-striate. *Petals* usually entire, broad lanceolate. *Stamens* and styles exserted.
Bright scarlet. ♃. June—July. Louisiana. 4–5 feet.

6. S. Antirrhina. *Stem* pubescent near the base, occasionally spotted. Lower *leaves* spatulate, pubescent along the midrib. *Flowers* in dichotomous panicles, with a flower in each division. *Calyx* 10-nerved. *Petals* sometimes wanting, small, 2-cleft. *Stamens* nearly as long as calyx, sometimes 5 abortive.
White. ☉. March—April. Moist soil, common along rivers in middle and lower Georgia. 1–2 feet.

7. S. Fimbriata. *Stem* weak, pilose, lower leaves obovate or spatulate, ciliate, obtuse, upper leaves small, lanceolate, pubescent. *Flowers* in a 3–5 flowered cyme. *Petals* with the limb, broadly cuneiform, fimbriate.
White. ♃. April. Common about Macon, Geo. 6–8 inches.

Genus VI. SAPONARIA.

Calyx tubular, 5-toothed. *Petals* 5, unguiculate. *Stamens* 10. *Styles* 2. *Capsule* 1-celled, 2-valved.

1. S. Officinalis. *Stem* terete, glabrous. *Leaves* ovate-lanceolate, or oval, opposite, connate, 3-nerved, glabrous. *Flowers* in clustered panicles, frequently double. *Crown* of the petals linear.
White, tinged with red. ♃. Through the summer. Introduced. 12–20 in.

Order XXII. PORTULACACEÆ.

Sepals 2, seldom 3–5, cohering at the base. *Petals* generally 5, æstivation imbricate. *Stamens* 5 and opposite the

petals, inserted with them into the base of the sepals. *Anthers* versatile. *Styles* 3-cleft, stigmatose within. *Capsule* 1-celled with a transverse dehiscence. *Placenta* central. *Seeds* numerous, campulytropous. *Embryo* curved. *Succulent* plants. *Leaves* without stipules.

Genus I. CLAYTONIA.

Calyx 2-sepaled. *Petals* 5, hypogynous, ob-cordate, emarginate bifid, sometimes entire, unguiculate, the claws more or less connate. *Stamens* 5 inserted into the claws of the petals. *Style* 3-cleft. *Capsule* 3-valved, few seeded. *Seeds* smooth and shining. *Herbs* with simple stems.

1. C. Caroliniana. *Root* tuberous. Radical *leaves* long-petioled, spatulate, cauline leaves ovate-lanceolate, or oval, one or two pair on a stem. *Flowers* in racemes on a nodding pedicel. *Sepals* obtuse. *Petals* nearly round, with purple veins.
   Rose colored. ♃. March. Mountains.

2. C. Virginica. Radical *leaves* few, linear-lanceolate; cauline ones a single pair, linear attenuate at the base, glabrous. *Flowers* in a simple raceme, peduncles 1-2-inches long, nodding. *Sepals* lanceolate acute, persistent. *Petals* oval, obtuse, striate much longer than the sepals. *Anthers* erect, oblong, rose colored. *Spring-beauty.*
   Rose colored. ♃. March—April. Near Columbia & Macon.

Order XXIII. LINACEÆ.

Sepals 5, persistent, with an imbricated æstivation. *Petals* 5, alternate with the sepals, with a twisted æstivation, hypogynous, unguiculate. *Stamens* 5. *Anthers* attached by the middle. *Pistils* 5. *Styles* few, spreading. *Stigmas* capitate. *Capsule* globose, or by false dissepiments, 10-celled, *dehiscence* septicidal. *Seeds* suspended, anatropous, ovate, compressed, mucilaginous when moistened. *Herbaceous* plants, annuals.

Genus I. LINUM.

There is but this genus belonging to this order, and the description of the order will suffice for the genus.

1. L. Virginianum. *Stem* erect smooth, branching above, glabrous. Radical *leaves* ovate, spatulate, cauline ones alternate, linear-lanceolate. *Flowers* in corymbose panicles, lax. *Sepals* acute, ovate, petals small. *Capsule* nearly globose. *Wild Flax.*
   Yellow. ☉. May—June. Common in Middle Car. & Geo. 18–36 in.

2. L. Rigidum. *Stem* angled, branched above. *Leaves* linear, acute, rigid with scabrous margins. *Sepals* broad-lanceolate, cuspidate, with scabrous margins, with 3 strong nerves.
   Yellow. ☉.

Remarks.—The *Linum Usitatissamum*, the common *Flax* has become almost naturalized in some parts of the United States, and is the the only species which is appropriated to any use, but the others possess similar useful properties. The woody

fibre of the bark is the material from which all linen fabrics are manufactured, and a mucilage composing a part of the testa of the seed is used in medicine, and a fixed oil, contained in the kernel of the seed, is the common *painters oil*, known under the name of *Linseed Oil*.

Order XXIV. GERANIACEÆ.

Sepals 5, persistent, with an imbricated æstivation, ribbed, one sometimes spurred or saccate. *Petals* 5, hypogynous, unguiculate, distinct. *Stamens* hypogynous, monadelphous, 10. *Ovary* composed of 5 carpels arranged around the extended axis. *Styles* 5, cohering round the axis, the stigmatic surface within the summit. *Carpels* distinct in fruit, each 1 or 2-seeded, dehiscing by the inner suture. *Seeds* pendulous, anatropous, without albumen. *Embryo* curved, cotyledons plaited. *Stems* tumid and separate at the joints.

Genus I. GERANIUM.

Sepals 5, equal. *Petals* 5, equal. *Stamens* 10, alternate ones larger, with nectariferous scales at the base. *Carpels* terminated by long awns.

1. G. Maculatum. *Stem* erect, retrorsely pubescent, dichotomous, somewhat angled. *Leaves* opposite, 3-5 parted, notched. *Segments* cuneate, pubescent. *Flowers* few, the terminal peduncle 2-flowered. *Sepals* hairy, oblong-lanceolate. *Petals* villous, obovate, cuneate, entire.

Crow foot. Spotted Crane's bill.

Purple. ♃. April—May. Common.

2. G. Carolinianum. *Stem* procumbent, assurgent, pubescent, diffusely branched. *Leaves* opposite 5-lobed, 3-cleft. *Flowers* in the divisions of the stem. *Peduncles* 2-flowered. *Sepals* ovate, hairy, 3-nerved, mucronate. *Petals* obovate, emarginate, equal in length to the sepals; five exterior stamens shortest. *Stigmas* 5 *Seeds* oval, minutely reticulated.

Rose color. ☉. March—June. Common about cultivated lands.

Order XXV. BALSAMINACEÆ.

Sepals 5, apparently only 4 from the union of the 2-upper ones, and sometimes only 2; the lowest one spurred, æstivation imbricate. *Petals* 4, united so as to appear but 2, hypogynous. *Stamens* 5, hypogynous. *Filaments* subulate. *Anthers* 2-celled. *Ovary* 5-celled, with a central placenta. *Stigmas* 5, sessile. *Fruit* 1 or 5-celled, 5-valved, many seeded. *Seeds* suspended. *Embryo* straight, anatropous. Succulent herbs. *Flowers* axillary.

Genus 1. IMPATIENS.

Sepals apparently only 4. *Petals* apparently only 2. *Stamens* 5, more or less united at the summit.

1. I. Pallida. *(I. Noli Tangere of Ell.)* *Stem* much branched, succu-

lent smooth. *Leaves* oval or ovate, serrate, teeth mucronate, on long petioles, glabrous. Lower *sepal* broad, spurred. *Balsam. Snap-weed.*
Yellow. ☺. July to Sept. Common in wet places. 2–5 feet.

2. I. Fulva. (*I. Biflora of Ell.*) *Leaves* rhombic-ovate, serrate, teeth mucronate. *Peduncles* 2–4-flowered. Lower *sepal* acutely cordate, with a long resupinate spur. *Flower* spotted with brown spots. *Plant* similar to the preceeding.
Deep orange. ☺. July—October. Swamps.

Order XXVI. OXALIDACEÆ.

Sepals 5 distinct or slightly cohering at the base, persistent, æstivation imbricate. *Petals* 5, hypogynous, unguiculate, equal, with a twisted æstivation. *Stamens*, those alternate with the petals shorter. *Anthers* innate, 2-celled. *Ovary* composed of 5-united carpels, opposite the petals, 5-angled, 5-celled, with 5-filiform styles. *Fruit* a 5-celled, 5-valved, capsule, 1–12-seeded. *Seeds* anatropous, with a loose fleshy testa, which burst when the seeds are mature. *Embryo* straight with a long radicle and foliaceous cotyledon. *Plants* herbaceous, with an acid juice.

Genus I. OXALIS.

Sepals 5, distinct or slightly united at the base. *Petals* 5. *Stamens* 10, those opposite the petals longer, monadelphous at the base. *Style* 5. *Capsule* 5-angled. *Seeds* one or several, tegmen ribbed, rugose. *Wood sorrel.*

1. O. Violacea. Bulb scaly. *Scape* umbelliferous, 3–7-flowered. *Leaves* ob-cordate, ternate, glabrous, dotted. *Flowers* large. *Sepals* lanceolate, obtuse, with an orange colored 2-cleft gland at the summit. *Petals* obovate. *Stigmas* 2-cleft.
Violet colored. ♃. March—May. Rich soils. Common. 6–9 inches.

2. O. Corniculata. *Stem* decumbent, branched, leafy, pubescent. *Leaves* glabrous on the upper surface, hairy underneath, ciliate. *Flowers* generally two on each peduncle. *Sepals* pubescent, erect, ciliate. *Petals* emarginate.
Yellow. ♃. Feb.—May. Low country.

3. O. Stricta. *Stem* erect, leafy, branching, hairy. *Flowers* in small umbels, peduncles 2–6-flowered. *Petals* obovate, generally entire. *Leaves* alternate near the base of the stem, in verticillate clusters towards the summit, leaflets ob-cordate. *Styles* not half as long as the shortest stamens, recurved.
Yellow. ☺. April—May. Common.

Order XXVII. ZYGOPHYLLACEÆ.

Sepals 5, persistent. *Petals* 5, obovate, æstivation convolute. *Stamens* 10, hypogynous, the 5 opposite the petals somewhat abortive. *Ovary* of 5-carpels, apparently 10-celled with an ovule in each cell. *Style* conical, furrowed. *Stig-*

ma capitate, ribbed. *Fruit* a regma, with 5 or 10 indehiscent cocci. *Seeds* anatropous. *Embryo* green, with foliaceous cotyledons. Herbaceous plants, with opposite, stipulate leaves.

Genus I. KALLSTRŒMIA.

1. K. Maxima. *Stems* procumbent, diffuse, trailing, pubescent. *Leaves* pinnate, generally with 3, sometimes 4 pairs of leaflets. *Leaflets* oblong, mucronate, slightly falcate, pubescent beneath, the terminal one largest. *Flowers* on solitary, axillary, 1-flowered peduncles. *Calyx* persistent. *Petals* obovate, longer than the calyx, withering. *Cocci* gibbous below, tubercled.
Yellow. ♃. June—Sept. Introduced from the West Indies. Savannah. 1–2 feet long.

Order XXVIII. ZANTHOXYLACEÆ.

Flowers dioecious or perfect, regular. *Sepals* 3–7, cohering at the base. *Petals* as many as the sepals or none, æstivation twisted-convolute. *Stamens* as many or twice as many as the petals. *Filament* distinct. *Anthers* introrse. *Ovaries* as many as the sepals, or sometimes fewer, distinct or united. *Fruit* of several drupes, or baccate or membranaceous, 2–5-celled, sarcocarp fleshy, separable from the endocarp. *Seeds* anatropous, solitary or in pairs, pendulous. *Embryo* lying within fleshy albumen. *Trees* or shrubs, usually with prickles.

Genus I. ZANTHOXYLUM.

Dioecious. *Sepals* usually 5, small, united at the base. *Corolla* none. *Stamens* 3, 5, 6 or 8, those of the pistillate flowers rudimentary. *Pistillate* flowers sometimes with a corolla. *Styles* 2, 3 or 5, and ovaries as many. *Carpels* crustaceous in fruit, 2-valved, 1–2-seeded. *Seeds* black, shining and globose when solitary, hemispherical when in pairs.

1. Z. Americanum. (*Z. Clava, Herculis of Linn.*) A shrub with the branches armed with strong stipular prickles. *Leaves* pinnate. *Leaflets* ovate, acuminate nearly sessile, more or less pubescent. *Flowers* in axillary umbels, greenish. *Prickly ash. Toothache bush.*
Greenish. ♄. April—May.

2. Z. Carolinianum. (*Z. Tricarpium of Ell.*) A small tree, with numerous expanding branches, bark with prickles. *Leaves* pinnate, alternate, leaflets obliquely lanceolate, crenate, serrulate, glabrous, shining above. *Flowers* in terminal panicles. *Sepals* minute. *Petals* long-oval, longer than the sepals. *Stamens* usually 5, but variable. *Styles* 2–3 incurved. *Capsule* 1-seeded. *Leaves* and bark very pungent to the taste. *Prickly Ash.*
June. On the coast of Car. Geo & Florida. 12-20 feet.

Genus II. PTELEA.

Dioecious. *Sepals* 4, united at the base. *Petals* 4 spread.

ing, much larger than the sepals. *Stamens* 4, alternate with and longer than the petals. *Filaments* hairy on the inside. *Fruit* a samara, 2-celled, with one seed in each cell, wing reticulated.

1. P. Trifoliata. A shrub, branching; the young branches pubescent. *Leaves* ternate. *Leaflets* sessile, ovate, the terminal one attenuate at the base, obscurely crenulate. *Flowers* in terminal panicles. *Petals* oval, pubescent, greenish. *Flowers* with a disagreeable odour.

Greenish. May—June. Middle Car. & Geo. 6–8 feet.

Order XXIX. ANACARDIACEÆ.

Dicœcious or perfect, regular. *Sepals* generally 5, distinct, or united at the base. *Petals* of the same number as the sepals, or none, when present inserted into a glandular disk at the bottom of the calyx, æstivation imbricate. *Stamens* the same number as the sepals, and opposite them, or twice as many, anthers introrse. *Ovary* solitary, of 1–5 carpels, all but one abortive, 1-celled. *Styles* usually 3, distinct or united. *Stigmas* 3. *Fruit* usually drupaceous, 1-seeded. *Seed* erect or suspended, anatropous. *Embryo* curved. *Albumen* none. *Vines* and shrubs, or small trees with a caustic juice. *Cotyledons* foliaceous.

Genus I. RHUS.

1. R. Typhina. A shrub or small tree, branches very villous. *Leaves* unequally pinnate, 11–31 leaflets, lanceolate-oblong, acuminate, acutely serrate, pubescent beneath. *Petioles* sometimes 2–3 feet long, villous. *Flowers* often polygamous or dicœcious, in dense panicles. *Fruit* a compressed drupe, covered with an acid crimson, velvet-like down. *Cellular* tissue of the wood orange color, with a strong aromatic odour. *Juice* resinous copious.

Stag horn Sumack.

Greenish yellow. ♄. June. 15–20 feet. Middle Georgia, in dense bunches on rich land.

2. R. Glabra. A large shrub, with milky juice, glabrous, generally tinged with purple. *Leaves* pinnate, with 13–31 leaflets, lanceolate-oblong, acuminate, smooth, acutely serrate, glaucous beneath. *Flowers* in terminal, thyrsoid panicles, often dicœcious. *Fruit* clothed with crimson, acid hairs.

Smooth Sumack..

Greenish yellow. ♄, July. Around fields, common. 6–12 feet.

3. R. Pumila. A procumbent shrub, villous. *Leaves* pinnate, about 11 leaflets, oval or oblong, toothed, pubescent. *Flowers* in terminal panicles, nearly sessile. *Fruit* clothed with a red, silky pubescence. Said to be very poisonous

♄. July. Upper country. 10–14 inches.

4. R. Copallina. A branching shrub; branches pubescent. *Leaves* pinnate. *Leaflets* 9–21, obliquely lanceolate, slightly revolute, glabrous on the upper surface, pubescent on the lower, unequal at the base. *Petiole* winged and jointed. *Flowers* in terminal panicles, somewhat leafy. *Fruit* red, hairy, sour.

Sumack.

Dull yellow. ♄. August. Common. 3–12 feet.

5. R. Vernix. A shrub, with glabrous branches, poisonous. *Leaflets* 7–13 membranaceous, oval, acuminate, entire, glabrous. *Flowers* in slender

panicles, axillary, mostly diœcious. *Fruit* sub-globose, smooth, greenish white. *Poison Sumack.*

Greenish. ½. May—June. Middle and upper districts of Geo. & Car.

6. R. Toxicodendron. A small, slender shrub. *Leaves* tri-foliate, somewhat pubescent, leaflets broad-oval or rhomboidal, acuminate, the lateral ones nearly sessile, unequilateral. *Flowers* in axillary racemes. *Fruit* sub-globose, white, poison. *Poison Oak. Poison Vine.*

White. ½. April—May. Common in dry pine woods. 2–6 feet.

7. R. Radicans. This plant agrees in many respects with the R. Toxicodendron and is made a variety of that species by Torrey & Gray. A large vine, climbing the highest trees, giving out radicles all along the stem, which enter the bark of the tree and afford support to the vine: small glabrous branches numerous. *Leaves* ternate, ovate, lanceolate, acute or acuminate, generally entire, lower ones rhomboidal. Differs entirely in habit from the T. preferring damp places. *Fruit* white. *Poison Ivy.*

Yellow. ½. May. Common. 40–60 feet long.

8. R. Aromatica. A small aromatic shrub; the young branches tomentose. *Leaves* pubescent when young, glabrous and coriaceous when old, ternate. *Leaflets* sessile, rhomboid-ovate, incisely toothed, the terminal one, narrowed at the base. *Flowers* diœcious, in axillary, compact, panicles, amentaceous. *Fruit* nearly spherical, light red, hispid, acid.

Yellow. ½. May—June. Upper districts of Car. & Geo. 2–3 feet.

Order XXX. TERNSTRŒMIACEÆ.

Sepals 5, deciduous, concave, coriaceous, æstivation imbricate. *Petals* 5, united at the base, alternate with the sepals. *Stamens* numerous, monadelphous, generally adhering to the base of the petals. *Ovary* 5-celled, situated on a flattened torus. *Placenta* central. *Styles* 5 or 6 distinct or united. *Fruit* 5 or 6-celled, capsule baccate, or coriaceous and indehiscent. *Seeds* anatropous or campulitropous, large. *Embryo* straight or curved. *Trees* or shrubs. *Leaves* alternate, without stipules. *Flowers* large and showy.

Genus I. GORDONIA.

Sepals 5, coriaceous, broad, ovate, or nearly round, imbricate. *Petals* 5, united at the base. *Styles* 5 united, forming a five angled column. *Capsule* ligneous, 5-celled, 5-valved, with 2 winged seeds in each cell.

1. G. Lasianthus. A large tree, with light coarse grained, mahogany colored wood. *Leaves* lanceolate-oblong alternate, glabrous, attenuate at the base, coriaceous, lucid on both sides, perennial, serrate. *Flowers* solitary, axillary towards the summit of the branches. *Sepals* silky, ciliate, ovate, nearly round. *Petals* hairy on the out side, obovate, united at the base with the stamens forming a short tube. *Stamens* very numerous. *Capsule* 5-celled, 5-valved. *Holly-bay.*

White. 4. May—Aug. Swamps and wet lands near the coast. 60–80 ft.

2. G. Pubescens. A tree, with spreading branches, the young branches smooth, pubescent at the summit. *Leaves* oblong-cuneate, sharply serrate, shining on the upper surface, hoary beneath, thin, somewhat membranaceous. *Flowers* solitary, axillary, on short thick peduncles. *Sepals* nearly

round, silky beneath. *Petals* obovate, silky on the outer surface. *Stamens* unequal, numerous. *Styles* short. *Capsule* nearly globular.
White. ♄. June—Aug. On the Altamaha. 40--50 feet.

Genus II. STUARTIA.

Sepals 5, united at the base, lanceolate. *Petals* 5, united at the base. *Stamens* very numerous, monadelphous, with the tube united to the base of the petals. *Styles* 5, distinct or united. *Capsule* 5-celled, 5-valved, somewhat ligneous. *Seeds* 2 in each cell slightly margined. *Shrubs* with showy flowers.

1. S. Virginica. A handsome shrub, with somewhat geniculate branches, pubescent when young. *Leaves* oval-lanceolate, acuminate, serrate, pubescent beneath. *Flowers* solitary or by pairs, axillary, on very short peduncles. *Sepals* united, forming a campanulate calyx, persistent, mucronate, 2 ovate bracts at the base and with the sepals covered with a silky pubescence. *Petals* 5, a little hairy, obovate. *Filaments* purple, hairy at the base. *Styles* united. *Stigmas* 5-lobed. *Capsule* hairy.
White. ♄. May. Rich soils, middle Car. & Geo. 8--12 feet.

2. S. Pentagynia. A shrub very much like the preceding. *Sepals* lanceolate, bracteolate. *Petals* larger than the preceding, undulate, deeply crenulate. *Styles* distinct. *Capsule* hairy with 5 angles, ligneous.
Cream colored. ♄. June. Mountains. Car. & Geo. 8--12 feet.

Order XXXI. MALVACEÆ.

Sepals 5, seldom 3 or 4, more or less united at the base, often calyculate, æstivation valvate. *Petals* hypogynous, equal the number of sepals. *Stamens* numerous, monadelphous, hypogynous. *Anthers* reniform. *Pollen* hispid. *Ovary* composed of several carpels, generally united, with as many styles. *Fruit* usually capsular, seldom baccate; cells 1 or many seeded; dehiscence loculicidal or septicidal. *Seeds* campulytropous or heterotropous. *Embryo* curved with foliaceous cotyledons. *Herbs* or shrubs. *Leaves* alternate.

Genus I. MALOPE.

Sepals 5 united, with 3 setaceous bracteoles, hairy.—*Capsules* with many distinct carpels, each 1-seeded, aggregated.

1. M. Malacoides. *Stem* sparingly branched, with hairs near the summit. *Leaves* ovate, crenate, obtuse at the base, glabrous on the upper surface, hairy along the vines beneath. *Flowers* axillary, solitary. *Petals* about twice as long as the sepals. *Capsules* hispid. *Seeds* compressed.
Yellow. ☉. Virginia.

Genus II. MALVA.

Sepals 5 united, with 3 bracteoles at the base, both hairy. *Carpels* generally more than 5, arranged circularly, indehiscent.

Genus II. MALVA.

Sepals 5, united, with 3 bracteoles at the base, both hairy. *Carpels* generally more than 5, arranged circularly, indehiscent.

1. M. Rotundifolium. *Stem* prostrate, hairy. *Leaves* 5–7-lobed, cordate, orbicular on long petioles, lobes obtuse, hairy. *Flowers* axillary; bracteoles subulate nearly as long as the sepals, hairy. *Style* many cleft.
White. ♃. May—July. About buildings. 1–2 feet long.

2. M. Papaver. *Stem* herbaceous, prostrate one to two feet long, hairy. *Petioles* long, (5–6 in.) hairy. *Leaves* digitate. *Lobes* from 3–5, long, margins and nerves bristled. *Peduncles* long, (5–6 in.) hairy. *Calyx* usually double, the interior 5 parted, margins and nerves furnished with acute bristles. *Petals* 5, obtuse, fringed or laciniate on the exterior margins, large, dark purple. *Croom in Sill. Jour. Vol. 26, p. 313.*
In pine woods. Florida and Southern parts of Georgia.

Genus III. MODIOLA.

Calyx 5-cleft, with 3 bracteoles at the base. *Carpels* arranged circularly, 2-valved spuriously 2-celled, 2-seeded.

1. M. Multifida. (*Malva Caroliniana of Ell.*) *Stem* diffuse, hirsute, prostrate. *Leaves* 3–5-lobed, obtuse, cordate at the base. *Lobes* dissected. *Carpels* numerous, hispid with 2 subulate horns, lunate, compressed, united in a truncated head.
Red. ☉. April—June. Common about buildings.

Genus IV. SIDA.

Calyx 5-cleft, angled, without an involucel. *Ovary* 5 or many celled, with a single ovule in each cell. *Capsules* consisting of 5 or more carpels, commonly 2-valved.

1. S. Spinosa. *Stem* branching, finely pubescent. *Leaves* alternate, cordate-oval, or broad lanceolate, serrate. *Stipules* setaceous, with a spinose tubercle at the base. *Flowers* axillary, solitary, on short peduncles. *Calyx* pubescent. *Petals* obovate. *Stigma* 5-cleft. *Carpels* 5, easily separated when mature, 2-lobed.
Yellow. ☉. May—July. Sandy soils. 1–2 feet.

2. S. Elliottii. *Stem* slender, herbaceous, nearly glabrous, with spreading branches. *Leaves* linear, serrate, varying in width, obtuse at the base, nearly glabrous. *Flowers* axillary. *Segments* of the calyx broad. *Petals* emarginate, striate, expanding. *Styles* many cleft. *Carpels* 10, united into a spherical head, glabrous.
Yellow. ♃. Aug.—Sept. On the coast of Car. & Geo. 2–4 feet.

3. S. Hispida. *Stem* branching, stellular tomentose. *Leaves* lanceolate, serrate, slightly hairy on both surfaces. *Flowers* on small axillary branches, crowded and nearly sessile. *Calyx* angular, hairy. *Petals* rather longer than the calyx.
Yellow. ♃. July—Aug. Sandy soils.

4. S. Rhombifolia. *Stem* suffrucicose, branching, stellular pubescent. *Leaves* in alternate clusters, hairy on the upper surface. *Flowers* axillary and usually solitary, on peduncles much longer than the petioles. *Carpels* 10–12 with 2 subulate horns. *Petals* obovate. *Calyx* angular, segments very broad, acuminate.
Yellow. ♃. July—Sept. Dry pastures. 1–2 feet.

Genus V. HIBISCUS.

Calyx consisting of 5 sepals, united at the base, with a 5-toothed summit, surrounded by a many leaved involucel usually distinct. *Petals* 5. *Stigmas* 5. *Capsule* 5-valved 5-celled, many seeded, dehiscence loculicidal.

1. H. Moscheutos. *Stem* suffructicose, erect, slightly tomentose, branching. *Leaves* ovate, serrate, acuminate, often with 3 acuminate lobes, tomentose underneath. *Flowers* axillary, attached by a long pubescent peduncle to the base of the petiole. *Calyx* persistent, pubescent; involucel 1–5-leaved, subulate, acute. *Petals* obovate, retuse. *Styles* exserted. *Capsule* ovate.

White, rose color, crimson at the center. ♃. Aug.—Sept. Margins of ponds. 3–5 feet.

2. H. Virginicus. *Stem* and leaves, tomentose. *Leaves* cordate-ovate, acuminate, those on the middle of the stem 3-lobed. *Flowers* in paniculate racemes, nodding. *Calyx* tomentose, the involucel 8 or 9 leaved, subulate. *Petals* fringed and hairy on the outer surface. *Capsules* hispid, with acute angles.

Rose color. ♃. July—Sept. In wet soils. 2–4 feet.

3. H. Aculeatus. Whole plant very scabrous, with minute recurved prickles. *Leaves*, the lower ones cordate, and angular, upper ones palmately 3–5-lobed, the lobes obovate, dentate. *Flowers* axillary at the upper parts of the branches. *Calyx* hispid, 5-lobed, each segment 3-ribbed. *Petals* hairy on the outer surface. *Capsule* hairy.

Yellow. ♃. June—Sept. In wet places. 3–6 feet.

4. H. Incanus. *Stem* tall, minutely tomentose. *Leaves* ovate, acuminate, obtusely serrate, tomentose on both surfaces. *Flowers* very large, axillary solitary, on peduncles jointed near the middle, confluent with the petiole.

Yellow. ♃. July—Aug. Southern Geo. 3–5 feet.

5. H. Carolinianus. *Stem* smooth, tall. *Leaves* cordate, acute, serrate, acuminate, glabrous on both surfaces, sometimes obscurely 3-lobed. *Flowers* axillary. *Calyx* slightly scabrous, involucel 12-leaved. *Petals* pubescent on the inner surface.

Purple. ♃. July—Sept. Raised by Elliott, from seed obtained from Wilmington Island, Geo. 4–6 feet.

6. H. Militaris. *Stem* branching, glabrous. *Leaves* hastate, 3-lobed, acuminate, serrate. *Flowers* solitary, axillary. *Involucels* 12–14-leaved, incurved, linear, subulate. *Corolla* tubular, campanulate, finely pubescent. *Capsule* ovate 5-valved, 5-celled, glabrous.

Rose color. ♃. July—Sept. Common on the banks of streams in the middle country. 3–4 feet.

7. H. Speciosus. *Stem* branching, glabrous. *Leaves* palmate, 5-parted, alternate, cordate, lobes irregularly serrate, generally with colored veins. *Flowers* solitary, axillary, on peduncles jointed near the summit. *Involucels* 12–15-leaved, subulate. *Petals* 4–5 inches long, obovate, a little pubescent near the base. *Capsule* glabrous, ovate, acute, obscurely angled. *Seed* pubescent.

Red. ♃. July—Sept. Southern Georgia and Florida. 4–8 feet.

Remarks.—The Flowers of this genus are very showy, and though coarse, form a conspicuous and beautiful ornament of the Flower Garden. They are used for no other purpose, than ornament, with a single exception. An Egyptian species affords seeds, which are employed in preparation of perfumery, on account of their peculiar odor, resembling musk.

Order XXXII. TILIACEÆ.

Sepals 4–5 deciduous, with a valvate æstivation. *Petals*

4–5, hypogynous. *Stamens* generally numerous, hypogynous, distinct. *Anthers* 2-celled. *Ovary* with 4–10 united carpels, with as many stigmas, styles united. *Fruit* a 2–5-celled. *Capsule* with several seeds in each cell. *Seeds* anatropous. *Leaves* alternate, with deciduous stipules. *Flowers* axillary.

Genus I. CORCHORUS.

Sepals 4–5. *Petals* 4–5, hypogynous. *Stamens* indefinite, rarely equal the number of petals. *Styles* short. *Stigmas* 2–5. *Capsule* 2–5-celled, with a loculicidal dehiscence, pod-like. *Seeds* numerous.

1. C. Siliquosus. *Stem* branching. *Leaves* ovate or broad-lanceolate, serrate. *Flowers* generally with 4 sepals and petals, late in the summer, often 5. *Capsule* pod-shaped, 2-valved, many seeded, linear.
Yellow. 4. Through the summer.

Genus II. TILIA.

Sepals 5, united at the base, deciduous. *Petals* 5. *Stamens* numerous, hypogynous. *Ovary* 5-celled, with 2-ovules in each cell, globose. *Fruit* ligneous, or coriaceous, sometimes only 1-celled, 1–2-seeded. *Trees* with simple, alternate, cordate leaves. *Flowers* with the peduncle attached to an oblong, foliaceous, bract.

1. T. Americana. A large, beautiful tree, with light, soft, white wood. *Leaves* obliquely cordate, nearly orbicular, glabrous, somewhat coriaceous. *Flowers* in axillary cymes. *Sepals* lanceolate pubescent without, woody within. *Petals* truncated at the summit, longer than the sepals. *Fruit* small, covered with a grayish pubescence.
Yellowish. ♄. May—June. On the coast from Penn. to Geo. 20–60 ft.

2. T. Alba. *Leaves* cordate, glabrous, pubescent beneath, sparingly toothed. *Flowers* in loose panicles. *Petals* emarginate. *Styles* longer than the petals.
Yellowish. ♄. May—June. On the coast from Penn. to Geo. 30–50 ft.

3. T. Pubescens. *Trees* with young branches, pubescent, old ones glabrous. *Leaves* alternate, cordate, glabrous on the upper surface, pubescent beneath, serrate, slightly mucronate. *Flowers* with the sepals scarcely united, deciduous, lanceolate, acute, tomentose. *Petals* lanceolate, longer than the calyx, crenulate at the summit.
Yellow. 4. May—June. Fertile soils. Low and Middle country. 20–60 ft.

Order XXXIII. MELIACEÆ.

Sepals 5, united at the base, with an imbricate æstivation. *Petals* 5, hypogynous, longer than the sepals, often cohering at the base or attached to the stamen tube. *Stamens* usually 10, usually with united filaments. *Anthers* sessile within the orifice of the tube. *Ovary* 5-celled, 1–2 ovules in each cell. *Fruit* capsular, 5-celled, 1-seeded. *Seeds* mostly anatropous, cotyledons foliaceous, albumen fleshy.

Genus I. MELIA.

1. M. Azedarach. A medium sized tree, with thick, spreading branches. *Leaves* bifinnate, leaflets, smooth, about 5 together, obliquely ovate-lanceolate, toothed. *Flowers* in axillary panicles. *Petals* glabrous or very slightly pubescent.

Remarks.—This tree although a native of Persia, has become naturalized in the Southern States. It affords a good shade and is not subject to the attacks of insects. The bark of the root has been used as a vermifuge, administered in decoction. It possesses narcotic properties and should be followed by some carthartic medicine.

Orddr XXXIV. VITACEÆ.

Calyx minute, 5-toothed. *Petals* 4–5, caducous. *Flowers* dicœcious. *Stamens* equal the number of petals and opposite them. *Filaments* sometimes slightly cohering. *Anthers* versatile. *Ovary* 2-celled, 2-ovules in each cell, surrounded at the base by an expansion of the torus. *Styles* short or none. *Stigma* simple. *Fruit* a globose, pulpy berry. Climbing shrubs. Lower leaves opposite, upper alternate. *Flowers* sometimes polygamous, small, greenish.

Genus I. VITIS.

Calyx scarcely toothed, small. *Petals* 4–5 spreading, or more generally united at the top, caducous. *Ovary* usually 2-celled with 2-ovules in each cell. *Fruit* a berry 1–3-celled and 1–5-seeded. *Peduncles* usually changed into tendrils.

1. V. Rotundifolia. *Stem* twining, ascending the highest trees, with smooth bark, sometimes not climbing, branches verrucose. *Leaves* cordate, both surfaces shining, glabrous; small tufts of hair at the junction of the veins, obscurely 3 lobed, toothed. *Flowers* in racemes, composed of numerous small umbels, polygamous. *Fruit* large, with a coriaceous integument, pleasant to the taste. *Bull-grape. Muscadine-grape. Fox-grape.*

Yellow. ♄. May—June. Common in the middle and low country of Georgia and Carolina.

2. V. Cordifolia. *Leaves* cordate, acuminate, toothed, glabrous, often slightly 3-lobed. *Flowers* numerous in loose racemes. *Fruit* small, sour, nearly black when ripe. *Winter-grape. Frost-grape.*

Yellow. ♄. Common on the banks of streams. May.

3. V. Riparia. *Leaves* unequally incised and toothed, teeth very coarse, acuminate, somewhat 3-lobed, petioles, margins and veins pubescent. *Flowers* fragrant in loose racemes. *Fruit* small, dark purple.

Winter Grape—pleasant fruit.

Yellow. ♄. May—July. Along the margins of rivers in the upper country.

4. V. Æstivalis. *Stem* very long glabrous, young branches tomentose. *Leaves* broadly cordate, 3-5-lobed, ferruginous, tomentose beneath when young, coarsely and unequally toothed, sometimes not lobed. *Flowers* in racemes opposite the leaves polygamous or dicœcious. *Fruit* small, black, very sour. *Summer Grape.*

Greenish yellow. ♄. May. In rich soil.

5. V. Labrusca. A large vine, covering the loftiest trees, branches covered with a ferruginous pubescence. *Leaves* broadly cordate, lobed and angled, repand toothed, tomentose beneath. *Racemes* small, fertile. *Fruit* dark purple, globose, large, of a disagreeable flavour. From the seed of

his species have been produced several very highly esteemed garden varie-ies. *Isabella, Alexander's Catawba and Bland's Grape.*
Greenish yellow. ♄. June. Rich, high spots in swamps.

6. V. Bipinnata. (*Cissus Bipinnata of Ell.*) *Stem* upright, somewhat winding, without tendrils. *Branches* numerous, glabrous, a little angular. *Leaves* bi-pinnate, glabrous, leaflets serrate, lower ones sometimes decompound, leaflets slightly cordate acute. *Flowers* in short spreading panicles. *Petals* expanding, generally pentandrous. *Style* conical. *Fruit* globose depressed, glabrous or slightly hairy, nearly black, 2-celled.
Greenish Yellow. ♄. June—July. Rich soils.

7. V. Ampelopsis. *Stem* climbing, glabrous. *Leaves* simple, 3-lobed, or truncate, serrate, pubescent on the veins beneath. *Flowers* in dichotomously divided panicles, without tendrils, opposite the leaves. *Calyx* obscurely toothed. *Petals* 5. *Stamens* 5. *Fruit* 1-celled, 1–2-seeded, small.
Yellow. ♄. June. So. Ca. in swamps.

Genus II. AMPELOPSIS. (*Cissus.*)

Calyx entire. *Petals* 5 reflexed, spreading. *Stamens* 5. *Ovary* 2-celled, with 2-ovules in each cell. *Style* conical. *Fruit* a 2-celled, berry with 1 or 2 seeds in each cell. *Flowers* perfect, in corymbose panicles. A shrubby vine.

1. A. Hederacea. *Stem* climbing lofty trees, throwing out short lateral fibres by which it attaches itself. *Leaves* on long petioles, digitate, by fives. *Leaflets* petiolate, oblong, coarsely serrate, glabrous, the middle leaflet largest. *Panicles* many flowered, opposite the leaves, the ultimate divisions umbellate peduncules crimson. *Petals* much longer than the calyx. *Fruit* deep blue, about as large as a pea. *American Ivy. Virginian Creeper.*
Yellowish green. ♄. June. In moist soils.

Order XXXV. ACERACEÆ.

Sepals 5 or rarely 4–9, united at the base, colored, with an imbricate æstivation. *Petals* as many as sepals and alternate with them, occasionally wanting. *Stamens* 8–12 distinct. *Anthers* oblong versatile or introrse. *Torus* discoid. *Ovary* composed of 2 united carpels. *Styles* united. *Stigmas* separate. *Fruit* a samara, composed of 2 indehiscent carpels, each 1-celled, 1 or 2 seeded. *Embryo* curved, with foliaceous cotyledons. *Trees* with opposite leaves.

Genus 1. ACER.

Calyx 5-cleft. *Petals* 5 or wanting. *Stamens* 5–7--10. *Leaves* simple.

1. A. Pennsylvanicum. A small tree with smooth striped bark. *Leaves* glabrous, sub-cordate, serrate, 3-lobed, lobes acuminate. *Flowers* in nodding racemes large. *Petals* obovate. *Striped Maple. Dog-wood.*
Yellowish green. ♄. May. Mountains. 10–15 feet.

2. A. Montanum. A small tree. *Leaves* sub-cordate, generally 5-lobed, serrate pubescent beneath; lobes acuminate. *Racemes* compound, erect. *Flowers* small. *Fruit* reddish, glabrous with slightly spreading wings.
Greenish yellow. April—May. Mountains. 8–12 feet.

3. A. Sacharinum. A large tree, with compact, white wood, and from the peculiar arragement of its woody tissues often exhibits an appearance distinguished by artists and mechanics by *Birds-eye* Maple. *Leaves* 3–5-lobed acuminate, dentate, sub-cordate at the base. *Flowers* in nearly sessile corymbs, with filiform long villous pedicels, pendulous. *Petals* wanting. *Fruit* glabrous. *Sugar Maple.*

Greenish yellow. ♄ May. Cool, damp places. Middle Geo. 50–80 ft.

4. A. Dasycarpum. A large tree. *Leaves* palmate, deeply 5-lobed, acuminate, serrate, and incised, pubescent underneath, almost white. *Flowers* small in fascicles with very short pedicels. *Petals* wanting. *Fruit* yellowish, wings large, pubescent when young. *Soft Maple.*

Pale yellowish purple. Feb. In river swamps, common. 50–70 feet.

5. A. Rubrum. A small tree. *Leaves* cordate, 3–5-lobed, serrate, glaucous beneath, lobes acute, doubly serrate, terminal one longest. *Flowers* in small axillary fascicles. *Petals* linear or oblong, polygamous. *Stamens* 5–8. *Fruit* glabrous, with slightly divergent wings, reddish.

Scarlet Maple. Red Maple. Swamp Maple.

Bright red or purplish. ♄. Feb. In swamps, common. 20–50 feet.

6. A. Negundo. A middle sized tree. *Leaves* pinnate, 3–5-leaflets, leaflets petiolate-oval or ovate, unequally toothed towards the apex. *Flowers* diœcious, in pendulous racemes. *Pedicels* of the staminate flowers filiform. *Petals* none. *Fruit* oblong with pale yellow, obovate wings.

Ashed leaved Maple. Box Elder.

Yellowish green ♄. May. Common on the banks of streams. 30–50 ft.

Order XXXVI. HIPPOCASTANACEÆ.

Calyx composed of 5 united sepals, either campanulate or tubular, 5-lobed or 5 toothed, with imbricate æstivation. *Petals* 4–5, unequal and irregular, hypogynous, unguiculate. *Stamens* 7–8 distinct, unequal. *Anthers* versatile. *Ovary* composed of 3 united carpels, 3-cornered, 3-celled. *Styles* united, filiform. *Ovules* 2 in each cell. *Fruit* coriaceous, sub-globose, 1–2–3-celled with 1-seed in each cell, dehiscence loculicidal. *Seeds* large with a smooth shining testa and pale hilum. *Embryo* curved, inverted without albumen. *Cotyledons* very thick, fleshy, cohering, not rising in germination.

Genus I. ÆSCULUS.

Sepals united, forming a 4–5 toothed, tubular calyx. *Petals* 4–6 unequal hypogynous, often united with the calyx. *Capsule* 2-celled. *Seeds* large, solitary.

1. Æ. Pavia. A shrub or small tree, with irregular, thick, obtuse branches. *Leaves* by fives. *Leaflets* oblong-lanceolate, unequally toothed, glabrous, or minutely pubescent along the veins. *Flowers* in terminal racemes. *Calyx* tubular, purplish. *Petals* 4, unequal, connivent, the claws of the lateral ones about as long as the calyx, upper ones the longest. *Stamens* 6–8. *Capsules* nearly round, 3-celled, coriaceous. *Buck-eye.*

Red. ♄. April—May. Common. 3–5 feet.

2. Æ. Flava. A small shrub, a tree, branches flexuous, glabrous. *Leaves* by fives pubescent along the mid-rib on the under surface. *Leaflets* lanceolate, ribbed, acuminate serrate. *Petiole* long, with a pubescent line along the upper side. *Flowers* in a terminal condensed panicle. *Calyx* pubescent,

5-cleft, with obtuse segments. *Petals* irregular very unequal, claws pubescent within, limb of the upper ones minute, of the lateral ones, larger, roundish. *Stamens* usually 7. *Filaments* villous. *Fruit* large, 2 inches in diameter, pubescent.

Yellow. ♄. March—April. Mountains, a tree 30–80 feet, and in middle Georgia a small shrub 4–6 feet.

3. Æ. Parviflora. A small shrub. *Leaves* by fives or sevens tomentose underneath. *Leaflets* petiolate, oval-obovate, serrate, acuminate. *Flowers* in long racemes. *Calyx* ob-conical. *Petals* 4 expanding, spatulate, nearly equal, longer than the calyx. *Stamens* much larger than the petals, 6–7.

White. ♄. April—May. Upper districts of Geo. & So. Ca. 3–4 feet.

Order XXXVII. SAPINDACEÆ.

Sepals 4, unequal, æstivation imbricate, 2 of them outer and larger. *Petals* equal in number to the sepals, and alternate with them, with a tuft of hair at the base of each. *Stamens* 6–8 filaments hairy near the base, anthers introrse. *Ovary* composed of 3 united carpels, surrounded by a glandular disk. *Styles* united. *Stigmas* obtuse. *Ovals* generally solitary. *Fruit* capsular, 3-celled, 2 obliterated, ventricose, glabrous, somewhat fleshy, 1-seeded. *Trees* with compound, pinnate leaves. *Fruit* saponaceous.

Genus I. SAPINDUS.

1. S. Saponaria. Small tree with smooth branches, somewhat geniculate. *Leaves* pinnate, generally 4 or five pair. *Leaflets*, falcate, very oblique, not opposite, entire. *Petals* 6–10 inches long, slightly furrowed. *Flowers* in dense, compound terminal and axillary panicles, diœcious or polygamous. *Soap-berry.*

White. ♄. On the coast of So. Ca. & Geo. 20–50 feet.

Order XXXVIII. CELASTRACEÆ.

Sepals 4–5, persistent, united at the base, æstivation imbricate. *Petals* equal in number to the sepals and alternate with them, with the same æstivation. *Stamens* usually 5, alternate with the plants, inserted on a broad fleshy disk at the bottom of the calyx. *Ovary* more or less surrounded by the disk, 2–5-celled, each with 1 or 2 or several ascending ovules. *Styles* 2–5, distinct or combined. *Fruit* capsular, 2–5-celled, with a loculicidal dehiscence. *Seeds* anatropous. *Embryo* straight. Shrubs.

Genus I. STAPHYLEA.

Sepals 5, united at the base, oblong, erect, colored, persistent. *Petals* 5, obovate. *Stamens* 5. *Ovary* composed of 3 carpels. *Styles* separable. *Fruit* inflated, capsule 2–3-celled. *Seeds* globular, slightly compressed, generally two in each cell. *Leaves* compound.

1. S. TRIFOLIA. A shrub, with slender, smooth branches. *Leaves* ternate, opposite. *Leaflets* ovate, acuminate, finely serrate, scarcely pubescent when grown. *Petioles* pubescent near the leaflets. *Flowers* in terminal, pendulous panicles. *Petals* obovate, spatulate ciliate at the base. *Stamens* exserted, filaments hairy at the base. *Fruit* 3-lobed, with the carpels distinct at the summit. *Bladder-nut.*

White. ♄. May. In middle Car. & Geo. 6--12 feet.

GENUS II. EUONYMUS.

Sepals generally 5, united at the base, spreading. *Petals* 5, *Stamens* inserted into the upper surface of the broad disk. *Anthers* with a thick connectivum at the back. *Ovary* imbedded in the disk, 3–5-celled, with 2–3 ovules in each cell. *Styles* short and thick. *Fruit* a 4–5-celled and as many lobed capsule, dehiscence loculicidal. *Seeds* usually enclosed in a fleshy aril. *Shrubs* with opposite, serrate leaves. *Peduncles* axillary.

1. E. AMERICANUS. A slender shrub, with small, slender, 4-angled branches. *Leaves* usually nearly eliptic, varying to lanceolate, oval or obovate, acute obscurely serrate. *Flowers* on axillary peduncles, each usually bearing, 3. *Calyx* very small. *Petals*, obovate, small, expanding, flat. *Stamens* short. *Capsule* deep red when mature, verrucose, fleshy. *Seed* 1 in each cell covered by a scarlet aril. *Strawberry tree. Burning bush.*

Green tinged with purple. ♄. Common. 4–5 feet.

2. E. ATROPURPUREUS. A shrub, with smooth branches. *Leaves* petiolate, oblong, lanceolate, acuminate, serrate, acute at the base. *Peduncles* compressed, many flowered, parts of the flower usually by fours. *Petals* broad-obovate. *Capsules*, lobed, smooth red.

Dark purple. ♄. June—July. Common along streams. 4--12 feet.

ORDER XXXIX. RHAMNACEÆ.

Calyx 4–5-cleft, æstivation valvate. *Petals* 5, distinct, cucullate or convolate, narrowed at the base, inserted into the throat of the calyx, sometimes wanting. *Stamens* 5, and opposite the petals. *Ovary* composed of 2–4 united carpels, 2–4-celled, cohering to the calyx or imbedded in a fleshy disk. *Ovules* erect, solitary. *Styles* more or less united. *Stigmas* distinct. *Fruit* fleshy or dry, generally united to the calyx. *Scales* anatropous, generally with fleshy albumen. *Shrubs*, generally, sometimes small trees, with thorny branches. *Flower*, not conspicuous, usually perfect, but sometimes monœcious, dicœcious or polygamous.

GENUS I. RHAMNUS.

Calyx urceolate or tubular, 4–5-cleft. *Petals* 4–5, emarginate or 2-lobed, convolute. *Torus* lining the tube of the calyx. *Ovary* free, 2–4-celled. *Styles* 2–4, generally distinct, *Fruit* a drupe, containing 2–4 seeds. *Flowers* small, generally in axillary clusters.

1. R. Carolinianus. A shrub, unarmed. *Leaves* alternate, oval-oblong, obscurely serrate or entire, glabrous, with parallel veins. *Flowers* in small umbels, perfect, 4--6-flowered. *Petals* 2-lobed, minute, embracing the stamens. *Stamens* 4 or 5. *Fruit* the size of a pea, generally 3-seeded.
White. ½. May—June. Common along the coast. 4--6 feet.

Genus II. SAGERETIA.

Calyx urceolate, 5-cleft. *Petals* convolute or cucullate. *Stamens* 5. *Disk*, concave, entire. *Ovary* partly embedded in the disk, petioles very short, 5-celled. *Style* short, 3-lobed. *Fruit* indehiscent, baccate, 3-celled.

1. S. Michauxii. A shrub, much branched, thorny when old. *Leaves* small, shining, opposite, membranaceous, oblong-ovate, denticulate, petioles very short. *Flowers* minute, in paniculate spikes. *Petals* small, entire, enclosing the stamens. *Stigma* nearly sessile. *Fruit* 3-angled.
White. ½. Oct.—Nov. Along the sea coast. 6–8 feet.

Genus III. CEANOTHUS.

Calyx campanulate, 5-cleft. *Petals* 5, saccate and arched, unguiculate. *Stamens* 5, exsert. *Disk* fleshy at the margin, surrounding the ovary. *Ovary* composed of 3 united carpels, 3-celled, with 3-ovules. *Fruit*, a dry, triangular, 3-celled, 3-valved capsule, 1 seed in each cell. *Seeds* obovate. Small shrubs, unarmed, with alternate leaves. *Flowers* perfect.

1. C. Americanus. *Root* large, dark red. *Stem* frutescent, the young branches pubescent. *Leaves* ovate or oblong-ovate, 3-nerved, acutely serrate, veins beneath very hairy, reflexed. *Petals* with long claws, enclosing the stamen. *Disk* with a 10-tooth border. *Seeds* convex extremely concave within. *New Jersy Tea.*
White. ½. Jan.—July. Common in middle Geo. & Car. 1–3 feet.

2. C. Microphyllus. *Stem* much branched, many from each root, branches, straight, slender, glabrous, yellow. *Leaves* small, obovate, clustered, glabrous on the upper surface, 3-nerved, somewhat denticulate, or entire. *Flowers* a loose raceme. *Peduncles* slender.
White. ½. April. Sandy pine forests, common. 1–2 feet.

3. C. Serpyllifolius. A small, slender shrub, decumbent, diffusely branched, branches filiform. *Leaves* very small, ovate-elliptical, serulate, obtuse, the lower surface, as well as the petioles strigose. *Peduncles* axillary. *Flowers* few, in a simple corymbose head.
White. ½. St. Mary's, Ga.

Remarks. The Ceanothus Americanus, commonly known by the names of New Jersey Tea and Red-root, has enjoyed considerable reputation among the Faculty. It takes the former name from its leaves having been used by the American army, as a substitute for tea, during the Revolutionary War. In aphthous, sore mouth, it has been highly recommended, and in the sore throat accompanying Scarlet Fever.

Order XL. LEGUMINOSÆ.

Sepals 5 united into a 5-toothed calyx, hypogynous, segments often unequal and variously combined, the odd segment inferior. *Petals* 5, sometimes none or less than 5, by abor-

tion, inserted into the base of the calyx, sometimes regular at others papilionaceous; the odd petal superior. *Stamens* generally deficient, distinct monodelphous, or diadelphous. *Anthers* versatile. *Ovary* simple, 1-celled, 1 or many seeded. *Stigma* simple. *Fruit* generally a legume, sometimes a drupe. *Seeds* 1 or several attached to the upper section, heterotropous or anatropous, sometimes with one aril, or large caruncle. *Embryo* straight, destitute of albumen, or with the radicle curved along the edge of the cotyledons. *Leaves* alternate, stipulate, entire.

Sub-Order I. PAPILIONACEÆ.

Sepals with an imbricated æstivation. *Stamens* 19, perigynous or inserted with the petals into the bottom of the calyx. *Corolla* papilionaceous.

Genus I. VICIA.

Calyx tubular, 5-toothed, the two upper teeth shortest. *Style* bent, outside of the style, near the summit, villous. *Legume* many seeded. *Leaves* pinnate. *Leaflets* in several pairs. *Petioles* extended into tendrils.

1. V. Caroliniana. *Stem* muched branched, running over shrubs. *Leaflets* 8–12, glabrous, oblong-linear, obtuse, mucronate, petiole extended into a 3-cleft tendril. *Flowers* numerous, in loose racemes. *Calyx* hairy, teeth short and obtuse. *Legume*, oblong, mucronate, coriaceous. *Seeds* nearly globular, dark colored.

White or blue. 4. April—May. Along the margins of swamps. 8–10 feet.

1. V. Acutifolia. *Stem* somewhat angled, glabrous. *Leaflets* 3–6, glabrous usually acute, linear, petiole terminating generally in an undivided tendril. *Stipules* linear-lanceolate, entire. *Flowers* in racemes larger than the leaves, 3–7 flowered; lower teeth of the calyx ovate lanceolate, upper ones very short. *Legume* somewhat falcate, mucronate, 4–10 seeded, seeds small.

White, tinged with blue. ☺. April. Rich soils. Common. 4–6 ft.

Genus II. ERVUM.

Calyx deeply 5-cleft, with nearly equal segments, linear, acute, about equal in length to the corolla. *Stigma* glabrous. *Legume* 2--4 seeded, oblong, seeds nearly globose. *Petioles* poduced into tendrils. *Peduncles* axillary.

1. E. Hirsutum. *Stem* much branched, diffuse. *Leaflets* 8–20, linear-lanceolate, truncate or retuse at the apex. *Stipules* subulate. *Petioles* terminating in divided tendrils. *Peduncles* 3–6 flowered near the summit. *Legumes* hairy, obliquely truncate, drooping, 2-seeded.

Bluish white. ☺. March—April. On cultivated grounds.

Genus III. LATHYRUS.

Calyx campanulate, 5-cleft, the the 2-upper segments short.

Style flat, villous on the upper side, widened towards the summit. *Legume* oblong, several seeded. *Peduncles* axillary. *Petioles* produced into tendrils.

1. L. Pusillus. A slender branching vine, glabrous, angled and winged. *Leaflets* a single hair, linear-lanceolate, acute at each end, slightly mucronate. *Stipules* large, acute, sagittate, slightly falcate. *Legume* 11–15 seeded.
Purple. ☺. April—May. Near Charleston.

Genus IV. PHASEOLUS.

Calyx 5-cleft, the 2 upper teeth often partially united, campanulate. Keel, stamens, and style spirally twisted together. *Legume* falcate, slightly compressed, many seeded. *Seed* reniform, nearly cylindrical. *Hilum* small, naked. An herbaceous, trailing plant.

1. P. Perennis. *Stem* voluble, climbing over small shrubs, pubescent. *Leaves* ternate, the lateral leaflets inequilateral, the terminal generally slightly cordate, pubescent beneath. *Stipules* lanceolate, small. *Flowers* in axillary racemes, loosely flowered. *Calyx* somewhat bilabiate, with 2 bracts at the base, teeth of the calyx broad and short. *Vexillum*, reflected, keel compressed and spiral. *Legume* falcate, mucronate, many seeded, attached alternately to each valve.
Purple. 4. July—Sept. In damp rich land.

2. P. Diversifolius. *Stem* prostrate, diffuse, retrorsely hirsute. *Leaves* ternate. *Leaflets* ovate, angular, or 2–3-lobed, slightly hairy along the margin and veins. *Flowers* capitate, 8–14, and peduncles 3–6 inches long, the lower tooth of the calyx narrow, longer than the tube, the upper formed of 2 sepals cohering nearly to the summit, having the appearance of a 4-cleft calyx. *Vexillum* reflected, keel acuminate, twisted. *Legume* terete, slender, slightly pubescent, many seeded, seeds woolly, hilum linear.
Purple. ☺. Aug.—Oct. Sand hills and the coast. 2–8 feet long.

3. P. Helvolus. *Stem* slender, prostrate or climbing, retrorsely hirsuted. *Leaves* ternate; leaflets oblong-ovate, or linear-oblong, tapering towards the summit. *Flowers* in heads, few, calyx with the upper segment broad, lower lanceolate, about the length of the tube; vexillum nearly round, keel as long as the vexillum, with a tooth at the base of the beak. *Legume*, terete, pubescent, straight, linear, many seeded. *Seeds* reniform, pubescent.
Purple. 4. July—Sept. In dry fertile soils. 3–5 feet.

Genus V. VIGNA.

Calyx somewhat bilabiate; upper lip entire. *Vexillum* with 2-callosities, near the base of the limb, compressing the wings. *Keel* not spirally twisted. *Stigma* lateral. *Legume* terete.

1. V. Glabra. (*Dolichos Luteolus of Ell.*) *Stem* twining, running over small shrubs. *Leaves* ternate, leaflets ovate, acuminate. *Flowers* 3–5 and peduncles 2–4 inches long, lower tooth of the calyx longer than the other; vexillum reflected; wings rhomboidal. *Keel* longer than the vexillum. *Legume* a little hairy, slightly compressed.
Yellow. ☺. Oct.—Nov. Around rice fields in the low country. 4–8 ft.

Genus VI. DOLICHOS.

Calyx bilabiate, the upper lip generally 2-cleft, seldom en-

tire ; lower lip 3-cleft or 3-toothed. *Vexillum* with 2--4 callosities near the base of the limb. *Style* cylindric. *Legume* compressed, few seeded. *Seeds* oval, compressed. *Hilum* oval.

1. D. MULTIFLORUS. *Stem* retrorsely pubescent, twining. *Leaves* ternate, large; leaflets nearly orbicular, abruptly acuminate, pubescent when young, nearly glabrous when old. *Flowers* numerous in elongated racemes, peduncles axillary, pedicels fasciculate, upper lip of the calyx generally entire, middle division of the lower lip longest, lanceolate, lateral ones short. *Legume* compressed, obtuse, 4-seeded. *Seed* oval, separated by partitions.
Purple. 4 June—July. On the banks of the Oconee and Ocmulgee. 6–12 feet.

GENUS VII. ERYTHRINA.

Calyx cylindrical, tunicated or bilabiate, 2-lobed. *Corolla* with a very long, lanceolate vexillum, destitute of callosities ; wings and keel small. *Stamens* unequal, straight, usually diadelphous, as long as the vexillum. *Style* straight, glabrous. *Legume* torulose, stipitate, many seeded, compressed between the seeds. *Herbaceous* plants, with trifoliate leaves.

1. E. HERBACEÆ. *Stems* glabrous, arising from a cermus, somewhat prickly. *Leaves* trifoliate, leaflets glabrous, rhomboidal, sometimes almost hastately lobed. *Flowers* in terminal spikes, very long. *Stamens* monodelphous, at the base, diadelphous above. *Seeds* bright scarlet.
Scarlet. 4. March—May. In rich soils. Middle G. 2–4 feet.

GENUS VIII. APIOS.

Calyx somewhat bilabiate, the upper lip with 2 short rounded teeth, the lower, with three teeth, the middle tooth lanceolate subulate, the lateral ones very minute. *Vexillum* reflected; keel falcate. *Legume* coriaceous, many seeded, slightly falcate, nearly terete.

1. A. TUBEROSA. *Root* tuberous. *Stem* climbing, covering small shrubs with its foliage, slightly pubescent. *Leaves* unequally pinnate, 5--7 leaflets, ovate-lanceolate, acute, sprinkled with hairs. *Racemes* axillary, many flowered. *Calyx* with the upper lip usually truncate, lower one with 1-lanceolate tooth, the lateral ones very small or none. *Seeds* reniform.
Brown. 4. July—Aug. Damp rich soils, common.

GENUS IX. WISTARIA.

Calyx campanulate, bilabiate, the upper lip truncate, the lower ones 3-cleft, forming 2 lanceolate teeth. *Vexillum* with 2-callosities at the base ; keel and wings falcate. *Legume* torulose, stipitate, many seeded, nearly terete, coriaceous. *Seeds* reniform, spotted. Twining shrubby plants, with unequal pinnate leaves.

1. W. FRUTESCENS. *Stem* twining, running over shrubs, branches pubes-

cent and somewhat angular. *Leaflets* 4--6 pair with a terminal one, pubescent, ovate-lanceolate. *Flowers* in axillary racemes, clustered, with large, colored, bracts at the base of the pedicels. *Vexillum*, broad, reflexed at the summit, green at the base. *Legume* rugose.

Purple. ♃. April—May. Damp rich soils, common.

Genus X. RHYNCHOSIA. (*Glycine of Ell.*)

Calyx 4-cleft, or 4-parted, or somewhat bilabiate, the lower lip 3-parted, the upper 2-toothed. *Vexillum* without callosities, keel-falcate, wings with 2-teeth at the base, *Style* smooth. *Legume* compressed, 1–2-seeded, short, generally ovate. *Seeds* generally caruncled. Generelly herbaceous plants.

1. R. Caribæa. *Stem* voluble, climbing over large shrubs, slightly pubescent, angled, branching. *Leaves* ternate. *Leaflets* round rhomboidal, acute, thin, dotted with resinous glands beneath, 3-nerved. *Flowers* in filiform racemes, peduncles angled. *Calyx* about half as long as the corolla, bilabiate, upper lip cleft half way down. *Petals* equal. *Legume* pubescent, falcate. *Seeds* glabrous, reniform.

Yellow. ♃. Aug.—Oct. On the coast and islands of Ga.

2. R. Monophylla. *Stem* pubescent, erect, low. *Leaves* simple, orbicular, or reniform, rugose, with yellow glandular dots on the under surface. *Flowers* in axillary racemes, or aggregated at the summit of the stem. *Calyx* slightly bilabiate, the upper lip 2-cleft, wings toothed on each side. *Anthers* globose. *Legume* pubescent, mucronate, falcate. *Seeds* orbicular, spotted.

Yellow. ♃. May—Aug. Common in dry soils. 2--3 inches.

3. R. Volubilis. *Stem* twining, angled, villous. Upper leaves ternate, the lower single. *Leaflets* nearly round or broadly ovate, rugose. *Racemes* few flowered. *Segments* of the calyx very acute. *Legume* falcate, villous. *Seeds*, compressed, reniform, spotted.

Yellow. ♃. May—July. In dry soils, common. 1--3 feet.

4. R. Mollissima. *Stem* erect, angled, tomentose. *Leaves* ternate, leaflets oval, rugose, obtuse, velvety-tomentose, glandular dots less distinct than in the three preceding species. *Flowers* in long (5--8 inches) racemes. *Calyx* deeply cleft. *Wings* toothed near the base.

Yellow. ♃. Near St. Mary's, Ga.

5. R. Erecta. *Stem* erect, angled, tomentose. *Leaves* ternate. *Leaflets* oblong, nearly acute, slightly rugose, middle ones somewhat rhomboidal. *Calyx* 4-parted, the upper segment bifid. *Corolla* small, wings toothed near the base. *Legume* falcate, villous. *Seeds* reniform.

Yellow. ♃. June—Aug. Common in poor, dry soils. 1-2 feet.

Genus XI. PITCHERIA.

Calyx 4-cleft, lobes nearly equal, subulate, the lower one a little the largest, the upper one slightly bifid. *Vexillum* nearly orbicular, without callosities. *Wings* small, narrow, with a subulate tooth at the base. *Keel* large, rounded. *Ovary* compressed, hairy, with 2 ovules. *Style* hairy towards the base. *Legume* oblong, sessile, compressed, 1–2-seeded. *Seeds* slightly carunculate, variegated.

1. P. Galactoides. *Stem* rigid, branching; branches angled, pubescent. *Leaves* small, numerous, trifoliate. *Leaflets* oval or obovate-oval, glabrous,

the lateral leaflets swollen and sessile. *Flowers* solitary or in pairs, on axillary peduncles. *Vexillum* partly enclosing the other petals.
Red or yellow. 4. May. Alabama. 2--3 feet.

Genus XII. GALACTIA.

Calyx 4-cleft. *Segments* acute, upper one broadest, with 2 bracts at the base. *Vexillum* broad, incumbent, without callosities, other petals oblong. *Keel* petals united at their apex. *Legume* terete, or slightly compressed, linear, many seeded. *Stigma* obtuse. *Racemes* axillary.

1. G. Glabella. *Stem* spreading, or climbing over shrubs, terete, glabrous or a little hairy. *Leaves* ternate, glabrous above, a little hairy beneath. *Leaflets*, ovate or elliptic-oblong, obtuse, emarginate. *Racemes* axillary, a little longer than the leaves; segments of the calyx acuminate, nearly glabrous. *Anthers* linear.
Reddish purple. 4. June—Sept. Rich shaded soils. 2--4 feet.

2. G. Pilosa. A vine climbing over small shrubs, retrorsely hirsute, terete. *Leaflets* ovate or oval, hirsute, particularly on the under surface. *Racemes* axillary, 6 -12 inches long. *Flowers* scattered. *Anthers* linear-oblong. *Legume* villous.
Pale purple. 4. June—Sept. In dry shaded soils.

3. G. Mollis. *Stem* prostrate, or climbing over small plants, retrorsely pubescent, terete. *Leaves* ternate. *Leaflets* oval, villous, canescent, pale beneath. *Racemes* longer than the leaves, somewhat crowded, flowers small. *Calyx* 4-cleft, lower segment longer than the others, with 2 subulate bracts at the base. *Anthers* oval. *Legume* straight, hispid.
Purple. 4. June—Sept. In dry soils.

4. G. Elliottii. *Stem* twining, running over small shrubs, sparingly pubescent. *Leaves* unequally pinnate. *Leaflets* 7--9, eliptical-oblong, lucid on the upper surface, pubescent beneath, petiole 2--3 inches long. *Flowers* on long racemes, clustered towards the summit of the peduncle pedicels short. *Calyx* hairy, lower segment longest, upper one ovate. *Legume* compressed, villous, falcate. *Seeds* 3--4, smooth, speckled.
White. 4. May—July. On the coast.

Genus XIII. CLITORIA.

Calyx tubular, 5-cleft, or by the union of the two upper segments, 4-cleft. *Vexillum* large, expanding, covering the wings, 2 bracts at the base of the calyx. *Legume* linear, compressed, many seeded.

1. C. Virginianna. *Stem* climbing, slightly scabrous, slender, angled. *Leaves* ternate. *Leaflets* ovate, or linear-oblong, slightly mucronate, scabrous, pubescent, or glabrous. *Flowers* in axillary racemes, generally 3. *Segments* of calyx linear-subulate, the 2 upper united nearer the summit than the others. *Style* glabrous. *Corolla* large. *Legume* long, (nearly 6 inches,)
Pale violet. 4. June—Sept. Dry soils, common.

2. C. Mariana. *Stem* sometimes erect, at others voluble, smooth. *Leaves* ternate. *Leaflets* ovate-oblong, or ovate-lanceolate, occasionally subcordate at the base. *Peduncles* 1-3-flowered. *Calyx* cylindrical, smooth, acute, much longer than the bracts. *Flowers* larger than the preceding species.—*Style* longitudinally bearded. *Legume* torulose, glabrous, about 4-seeded.
White, or pale blue. 4. May—Aug. Dry soils. 2 feet.

Genus XIV. AMPHICARPA.

Calyx 4-toothed, the two upper sepals united nearly or quite to the summit, tubular, slightly gibbous at the base, destitute of bracts. *Vexillum* broad, slightly auricled at the base, appressed. *Keel* and wing petals nearly straight, and nearly equal, unguiculate, lamina oblong. *Stamens* diadelphous.—*Ovary* stiped, with 2–4-ovules. *Style* glabrous, filiform. *Legume* compressed, stipitate, 2–4 seeded. The flowers of this genus, towards the summit of the stem, usually differ from those near the base. The upper ones usually perfect in all their parts, while the lower sometimes are wanting in a corolla and a part of the stamens; but the latter are the ones that usually mature the fruit. Climbing, herbaceous, plants.

1. A. Monoica. *Root* creeping. *Stem* slender, climbing over small shrubs, retrorsely hirsute, angular. *Leaves* ternate, ovate, or rhombic-ovate, thin, glabrous or hairy, a little oblique. *Flowers* in pendulous racemes, on filiform peduncles. *Calyx* hairy at the base, 4-toothed, acuminate. *Legume* smooth, 3–4-seeded.

White, tinged with violet. 2. June—Sept. Rich lands, common. 2–5 ft.

Genus XV. SESBANIA.

Calyx 5-toothed, teeth nearly equal, with 2 caducous bracteoles at the base. *Vexillum* roundish, with 2 appendages on its claw. *Stamens* diadelphous. *Legume*, long, (10–12 in.) linear, slender, cylindrical or compressed, many seeded. *Seeds* cylindrical-oblong. *Herbaceous* plants, with pinnate leaves.

1. S. Macrocarpa. *Stem* with expanding branches, glabrous, herbaceous. *Leaves* pinnate 10–25 pair. *Leaflets* linear-elliptical, glabrous, entire, slightly mucronate. *Flowers* in axillary racemes, few flowered, shorter than the leaves. *Calyx* pubescent along the margin, two upper teeth reflected. *Vexillum* reflected. *Legume* somewhat 4 angled about 12 inches long.

Genus XVI. GLOTTIDIUM.

Calyx 5-toothed, teeth nearly equal, small, obtuse. *Vexillum* short, broad, slightly unguiculate, reniform, keel petals united at the middle. *Legume*, eliptical-oblong, stipitate, compressed, 2-seeded. *Seeds* compressed.

1. G. Floridanum. *Stem* glabrous. *Leaves* equally pinnate 10–20 pairs. *Petioles* terminated by a bristle. *Leaflets* oblong-linear, mucronate, glabrous. *Racemes* 4–8 flowered. *Petal* nearly equal. *Legume* about 2 inches long, rigidly mucronate, both sections thickened. *Valves* separating into an exterior coriaceous portion and an interior membrane enclosing the seeds.

Yellow. ○. Aug.—Sept. Damp soils. So. Ca. & Florida.

Genus XVII. ROBINIA.

Calyx campanulate 5-toothed, the two upper sepals united nearly to the summit, so as to give the calyx somewhat the ap-

pearance of being only 4 toothed. *Vexillum* broad and large. *Keel* obtuse. *Stamens* diadelphous. *Style* bearded next the free stamen. *Legume* compressed, many seeded, long, the placental suture margined. *Seeds* compressed. *Trees* or shrubs, with stipular spines. *Leaves* unequally pinnate.

1. R. Pseudacacia. A tree, with virgate branches. *Leaves* with 4--7 pairs of leaflets. *Leaflets* frequently alternate, oval, emarginate, with setaceous stipules. *Flowers* odorous, in axillary racemes. *Calyx* pubescent, spotted. *Legumes* 2--3 inches long, smooth.

White. ♄. March—April. A large tree among the Monutains, 60--80 feet; smaller in the middle country. 30--40 feet.

2. R. Viscosa. A small tree with viscid branches. *Leaves* with 5--7 pairs. *Leaflets* ovate, stipular spines very short. *Petioles* glandular-viscid. *Flowers* inodorous, in axillary, erect racemes. *Legumes* obliquely lanceolate, mucronate, 3--5-seeded, glandular-viscid.

White, tinged with red. ♄. Mountains. Car. & Geo. 20 -40 feet.

3. R. Hispida. A small shrub, the young branches reddish, hispid. *Leaves* unequally pinnate. *Leaflets* oval nearly round, mucronate; almost destitute of stipular spines. *Racemes* loose, flowers inodorous, axillary.

Rose color. ♄. April. Mountains. 3 -6 feet.

Var. Rosa. *Leaflets* mostly scattered, not hispid, stipules spiny; young branches petioles and under surface of the leaves pubescent.

Middle Carolina and Georgia. 2–4 feet.

Var. Nana. Very small shrub, scarcely a foot high. Near Columbia South Carolina and Macon Geo.

Genus XVIII. TEPHROSIA.

Calyx 5-toothed. *Teeth* subulate nearly equal; no bracts at the base of the calyx. *Vexillum* large, nearly round, spreading or reflexed. Generally monadelphous. *Style* usually bearded, filiform. *Legume* sessile, compressed, coriaceous, many seeded. *Seeds* compressed. *Herbaceous* plants, with unequally pinnate leaves.

1. T. Virginiana. *Stem* erect, pubescent, in dense branches, slightly angular. *Leaflets* numerous, oblong-lanceolate, mucronate, silky-pubescent. *Flowers* in terminal racemes, compact. *Calyx* deeply 5-cleft, hairy. *Legume* compressed, hairy. *Seeds* reniform.

Dull yellow tinged with purple. ♃. May—July. Common in pine barrens. 10–15 inches.

2. T. Paucifolia. *Stem* erect or decumbent, pilose hispid, with rusty hairs. *Leaves* scattered, few. *Leaflets* 4–7 pairs, eliptic, often slightly cuneate, mucronate, silky-pubescent, petiole villous. *Flowers* on long peduncles, opposite the leaves, bearing but few flowers, 4–5. *Calyx* hispid. *Vexillum* hairy on the outer surface. *Legume* compressed, hispid.

Purplish red. ♃. June—Sept. Common in pine woods. 10–15 in.

3. T. Hispidula. *Stem* erect much divided, dichotomous, slightly pubescent. *Leaflets* numerous 11–17, eliptical-oblong, mucronate glabrous on the upper surface, hirsute on the lower, slightly retuse. *Racemes* as long as the leaves, few flowered, opposite the leaves. *Calyx* very villous, segments expanded. *Legume* straight, mucronate, somewhat hispid. *Seeds* reniform, compressed, spotted.

Pale red. ♃. May—Aug. Dry soils, common. 10–18 inches.

4. T. Chrysophylla. *Stem* prostrate, pubescent, dichotomous. *Leaves*

nearly sessile, with 5-9 leaflets, cuneate-obovate, obtuse, coriaceous, smooth, above, silky hirsute beneath. *Peduncles* longer than the leaves, few flowered, slightly compressed. *Legume* linear, 8–10-seeded.

Reddish-purple. 4. May—Aug. Common around Savannah, found in Middle Georgia and Florida. 10–12 inches.

Genus XIX. INDIGOFERA.

Calyx 5-cleft, expanding, minute, subulate. *Vexillum* nearly round, emarginate. *Keel* furnished with a spur on each side. *Stamens* diadelphous. *Style* filiform, glabrous. *Legume* 1 or many seeded.

1. I. Caroliniana. *Stem* erect, branching, glabrous, striate. *Leaves* unequally pinnate. *Leaflets* 5–6 pairs, mucronate, oval-oblong, slightly pubescent, glaucous underneath. *Flowers* in slender axillary racemes, a bract at the base of each pedicel. *Calyx* small with 5 subulate teeth, pubescent. *Keel* longer than the vexillum. *Legume* short, pointed with the style.

Indigo Plant.

Yellowish brown. 4. July—Sept. Poor soils. 3–7 feet.

2. I. Leptosepala. *Stem* decumbent, rough. *Leaves* unequally pinnate. *Leaflets* 7–9 obovate-oblong, nearly glabrous on the upper surface. *Flowers* in racemes longer than the leaves, nearly sessile. *Segments* of the calyx equal, subulate. *Legumes* reflexed, linear nearly terete 6–7-seeded, pubescent, terminated by the style.

Pale scarlet. 4. Georgia. 2–3 feet.

Genus XX. PSORALEA.

Calyx campanulate, 5-toothed, sprinkled with glandular dots, lower segment a little the longest. *Stamens* diadelphous. *Legume* indehiscent, 1-seeded, slightly beaked, as long as the calyx.

1. P. Canescens. *Root* tuberous. *Stem* branching, canescently pubescent. *Leaves* entire, single above and trifoliate below, broad obovate-lanceolate, dotted. *Stipules* subulate. *Peduncles* axillary, 4–7-flowered. *Calyx* inflated, glandular, brownish. *Legume* short, glandular.

Yellowish. 4. May—July. Middle Car. & Geo. Common. 2–3 ft.

2. P. Lupinellus. *Stem* somewhat branched, slender, glabrous. *Leaves* digitate on long petioles. *Leaflets* filiform 5–7-foliate. *Racemes* longer than the leaves, many flowered. *Peduncles* thick. *Calyx* small, glandular, the lower segment longest. *Corolla* much longer than the calyx with a suborbicular vexillum, small, with a recurved point, rugose.

Pale violet. 4. May—July. Sand-hills of middle Georgia. 2–3 feet.

3. P. Virgata. *Stem* virgate, somewhat branched, slightly pubescent. *Leaves* simple, linear-lanceolate, runate, with setaceous stipules. *Flowers* in cylindrical spikes. *Spikes* axillary, not as long as the leaves. *Bracts* oblong, calyx dotted with glands, lower segment a little the longest. *Corolla* but little longer than the calyx. *Legum* 1-seeded.

Pale violet. 4. Near St. Marys, Geo. 2 feet.

4. P. Heliotoides. *Stem* diffuse, slightly pubescent, branching. *Leaves* ternate. *Leaflets* oblong-lanceolate, dotted with glands. *Flowers* in oblong spikes, with broad conspicuous colored, caducous bracteas. *Spikes* axillary and terminal. *Calyx* hairy, purplish, glandular. *Keel* small. *Legume* mucronate, oval, rugose, 1-seeded.

Purple. 4. May—June. Very common in middle and upper Carolina and Georgia. 2 feet.

5. P. EGLANDULOSA. *Stem* pubescent. *Leaves* trifoliate, leaflets oblong-lanceolate. *Flowers* in oblong spikes. *Bracts* broad lanceolate, acuminate. *Calyx* very villous. *Legume* nearly orbicular, with transverse wrinkles. Very similar to the preceding.

Purple. 4. May—June. Dry soils. 1–2 feet.

6. P. MULTIJUGA. *Stem* thick, glabrous, furrowed. *Leaves* pinnate, irregular, 9–10 pairs. *Leaflets* oblong-lanceolate, hairy on the under surface, sometimes pubescent on the upper. *Flowers* in oblong spikes. *Bracts* small. *Calyx* with very long teeth, villous on the margin. *Legume* 1-seeded.

Violet. 4. May—June. Middle and upper country. I found it near Greenville, So. Ca. 10--20 inches.

GENUS XXI. AMORPHA.

Calyx campanulate, 5-cleft, persistent. *Vexillum* ovate, concave, unguiculate; wings and keel wanting. *Stamens* monadelphous. *Style* filiform. *Legume* falcate, rough or tuberculate with glands, 1–2-seeded. *Shrubby* or herbaceous plants, with pinnate leaves, leaflets numerous, punctate. *Flowers* in spiked racemes, numerous, pedicels articulated with the flower.

1. A. FRUCTICOSA. A shrub with pubescent branches. *Leaves* alternate, petiolate, generally pinnate, leaflets oval, or eliptical-oblong, obtuse, petiolate. *Flowers* in terminal racemes. *Calyx* turbinate, pubescent. *Vexillum* emarginate, obovate, twice the length of the calyx. *Style* hairy. *Legume* 2-seeded.

Dark purple. ♄. On the margin of rivers in the low country. 6--16 ft.

2. A. PUBESCENS. A small shrub, pubescent, slightly muricate. *Leaves* equally pinnate, many pairs, 20--24. *Leaflets* eliptical, petiolate, mucronate, very pubescent. *Flowers* in long panicled spikes. *Teeth* of the calyx nearly equal, purple. *Vexillum* ob-cordate, longer than the calyx.

White. ♄. June—July. Damp soils. 2--4 feet.

3. A. CANESCENS. *Stem* suffructicose, softly canescent. *Leaves* numerous and crowded, 15--34 pairs of leaflets, closely arranged, ovate-eliptical, mucronate, small. *Flowers* in paniculate-spikes, sessile, terminal. *Vexillum* nearly orbicular, tapering slightly at the base. *Legume* 1-seeded.

Lead Plant.

Blue. ♄. July—Aug. Banks of streams, middle Georgia. 1--3 feet.

4. A. CAROLINIANA. A small shrub, nearly glabrous. *Leaflets* oblong or eliptical petiolate, dotted, the lowest pair approximated to the stem. *Flowers* on very short pedicels. *Calyx* with short teeth, the two upper obtuse, the three lower longer or nearly equal, villous on the margin. *Style* hairy towards the base.

Dark blue. ♄. July. Near Wilmington and Newbern. *Curtis & Croom.* 4--5 feet.

GENUS XXII. DALEA.

Calyx 5-cleft, often glandular, with nearly equal segments. *Petals* unguiculate, the keel and wing petals, united to the stamen tube. *Vexillum* inserted into the base of the calyx, short, limb cordate. *Stamens* monadelphous, the tube being 3-cleft. *Ovary* with two collateral ovules. *Legume* 1-seeded, indehiscent. *Leaves* unequally pinnate. *Flowers* in dense spikes, often capitate.

1. D. ALOPECUROIDES. *Stem* erect, glabrous, branched. *Leaves* numer-

ous. *Leaflets* 10--14 pairs, narrow elliptical, dotted beneath. *Flowers* in cylindrical spikes, villous, caliculate. *Segments* of the calyx, lanceolate, acuminate, hairy.

Blue. ☉. Middle Carolina and Georgia. 1--2 feet.

Genus XXIII. PETALOSTEMON.

Calyx 5-toothed, teeth nearly equal. *Petals* 5, on filiform claws, 4 of them united to the stamen tube, the 5th free, with an oblong-cordate limb. *Stamens* 5, monadelphous. *Legume* indehiscent, 1-seeded. *Herbaceous* plants glandular. *Flowers* in terminal spikes or heads.

1. P. Carneum. *Stem* glabrous, much branched, slender. *Leaves* fasicled. *Leaflets* 2--3 pairs, linear, lanceolate, entire, glandular. *Flowers* in oblong spikes. *Calyx* glabrous, ovate, striate, 5-cleft, slightly pubescent on the margin, deeply cleft on the upper side. *Petals* oblong, unguiculate.

Rose color. 4. Aug. Near Macon, on the Houston road. 1--2 feet.

2. P. Corymbosum. *Stem* erect, branching, glabrous. *Leaves* fasicled; leaflets 3--4 pairs, linear entire, glabrous, dotted underneath. *Stipules* 2, subulate. *Flowers* in heads. *Peduncles* glandular. *Calyx* deeply cleft, plumose. The upper petal with a long claw. *Legume* small, 1-seeded, oblong.

White. 4. Sept—Oct. Near Macon, on the road to Browns' Mt. 1--2 ft.

Genus XXIV. TRIFOLIUM.

Calyx campanulate 5-cleft, with setaceous segments. *Petals* more or less united, vexillum, longer than the wings. *Legume* membranaceous, 1–6-seeded, generally indehiscent. *Leaves* palmately divided, or trifoliate; leaflets 3–7. *Flowers* in dense spikes or heads. *Clover. Tree foil.*

1. T. Arvense. *Stem* silky, pubescent, erect, branching. *Leaves* spatulate-lanceolate, obtuse, ternate, minutely 3-toothed. *Flowers* in oblong, villous spikes. *Petals* nearly separate. *Legume* 1-seeded.

Stone Clover. Rabbit-foot.

Whitish, with purple spot on the wings. ☉. June—Aug. 8--12 in.

2. T. Pratense. *Stem* glabrous, ascending, sometimes slightly hairy; leaflets oval finely serrulate, or nearly entire. *Flowers* in ovate spikes. *Calyx* very hairy. *Corolla* longer than the calyx. *Petals* unequal.

Red Clover.

Purple. 4. April—May. Rich soils. 2--3 feet.

3. T. Reflexum. *Stem* pubescent, or ascending. *Leaves* ternate; leaflets obovate, somewhat rhomboidal, pubescent, upper ones acute, lower emarginate. *Flowers* in somewhat umbellate dense heads. *Calyx* hirsute, deeply parted, with subulate teeth. *Vexillum* broad-ovate, twice as long as the calyx. *Legume* 3--5-seeded. *Buffalo Clover.*

Vexillum red, wings and keel, white. ☉. April—June 12–18 inches.

4. T. Repens. *Stem* glabrous creeping diffuse, sometimes sprinkled with a few hairs. *Leaves* ternate, nearly glabrous; leaflets ovate-oblong, emarginate, denticulate. *Flowers* in umbellate, globose, heads, on long axillary peduncles at first erect, afterwards reflected. *Calyx* nearly glabrous, with unequal teeth. *Legume* 4-seeded, cylindrical. *White Clover.*

White. 4. April—Nov. Waste places, common. 6--12 inches.

5. T. Carolinianum. *Stem* small, procumbent, hairy. *Leaves* ternate, ob-cordate, pubescent, toothed, glaucous beneath. *Flowers* in small umbels, at first erect, afterwards reflected. *Calyx* persistent, unequally 5-cleft. *Vex-*

illum longer than the calyx. *Keel* very short. *Legume* 4-seeded, turgid. White tinged with purple. ☺. March—May. Sandy fields.

Genus XXV. MELILOTUS.

Calyx tubular, campanulate, 5-toothed, persistent. *Petals* deciduous. *Vexillum* longer than the wing; keel petals, united, cohering to the wings. *Style* filiform. *Legumes* coriaceous one to few seeded, nearly globose. *Leaves* trifoliate. *Flowers* in axillary racemes.

1. M. Officinalis. *Stem* erect, angular, glabrous, with spreading branches; leaflets-obovate, obtuse remotely serrate, glabrous. *Flowers* in loose racemes, teeth of the calyx unequal. *Legumes* 2-seeded, rugose, acute, ovate. *Yellow Melilot.*

Yellow. ☺. June—Aug. Rich soils. Introduced. 2--4 feet.

Genus XXVI. MEDICAGO.

Calyx somewhat cylindrical, 5-cleft, keel of the corolla, bending from the vexillum. *Legume* spirally coiled, many seeded, compressed.

1. M. Lupulina. *Stem* procumbent, diffuse, assurgent, angled, hairy. *Leaves* ternate, on short petioles; leaflets oblong, cuneate, emarginate, denticulate near the summit, hairy. *Flowers* in axillary heads. *Legumes* reniform, 1-seeded, black.

Yellow. ♃. June—Aug. Cultivated grounds. Introduced. 6--12 in.

Genus XXVII. ASTRAGALUS.

Calyx 5-toothed, keel obtuse. *Stamens* monadelphous. *Legume* 2-celled, by the inflexion of the lower suture. *Leaves* unequally pinnate; leaflets numerous.

1. A. Obcordatus. *Stem* nearly glabrous, decumbent or assurgent; leaflets 15–25, ob-cordate, small, on partial petioles. *Flowers* in ovate spikes *Calyx* hairy, with subulate teeth. *Legumes* oblong slightly curved, acute.

White. ♃. Southern Georgia, Florida. 4–8 inches.

2. A. Canadensis. *Stem* erect, canescent, somewhat branched; leaflets very numerous, 25–41, oblong, pubescent underneath. *Flowers* in compact elongated, axillary spikes; peduncles long, bracts subulate. *Calyx* hairy. *Teeth* subulate, small, corolla much longer than the calyx. *Legume* terete, glabrous, many seeded.

Pale yellow. ♃. June—July. Mountains. 1–3 feet.

3. A. Glaber. *Stem* erect, glabrous. *Leaflets* numerous, 15–23, small, linear oblong, hairy underneath. *Flowers* in elongated spikes, few flowered 3–6; peduncles long as the calyx. *Legume* glabrous, acute at each end, incurved.

Whitish. ♃. April. Low country of Ga. 1–2 ft.

Genus XXVIII. PHACA.

Calyx 5-cleft, the two upper segments more remote than the others. *Keel* obtuse. *Style* smooth; stigma capitate.

Legume inflated, 1-celled. *Flowers* in axillary racemes, herbaceous.

1. P. Villosa. A small hairy plant, procumbent. *Leaves* unequally pinnate; leaflets 9–17 oval, oblong, petiolate, rather distant. *Flowers* on peduncles about as long as the leaves, clustered near the summit, 8–20. *Segments* of the calyx acute, long, bracts lanceolate-subulate. *Legumes* villous, sessile, inflated. *Seeds* small, few.
Yellow. ☉. April—May. On the coast.

Genus XXIX. ZORNIA.

Calyx bilabiate, upper lip emarginate, the lower 3-cleft. *Petals* inserted into the calyx, vexillum broad-cordate, revolute; keel petals cohering. *Stamens* monadelphous, alternately shorter; anthers alternately oblong and globose.—*Legume* jointed, hispid, 4–5 joints. Perennial herbaceous plants. *Leaves* digitate, petioled, stipulate. *Flowers* with 2 bracts.

1. Z. Tetraphylla. *Stem* prostrate, branching, diffuse. *Leaflets* 4, lanceolate, glabrous. *Flowers* in long spikes 5–9 flowered, alternate; bracts ovate, 5-nerved; upper segments of the calyx broad, emarginate, all the segments ciliate; vexillum broad, reniform; wings broadly ovate as long as the vexillum; keel short. *Legume* 2-4 jointed, joints nearly round.
Yellow. ♃. July. Sandy lands. 1–2 ft. long.

Genus XXX. STYLOSANTHES.

Calyx tubular, somewhat bilabiate, with two lanceolate bracts at the base. *Corolla* inserted into the calyx; vexillum broad; keel small. *Stamens* monadelphous. *Anthers* alternately linear and ovate. *Style* short and recurved.—*Legume* 1–2 jointed, hooked.

1. S. Elatior. *Stem* erect, pubescent on one side. *Leaves* pinnate; leaflets 3, lanceolate glabrous, entire. *Leaves* around the capitulum simple, lanceolate. *Flowers* in a terminal compact capitulum, all sterile but 2. *Calyx* with the upper lip 2-cleft, the lower 3-cleft. *Legume* hooked at the summit, 1-celled. Sterile flowers furnished with 2 plumose lanceolate bracts.
Yellow. ♃. May—Aug. Common. 10–15 inches.

Genus XXXI. ÆSCHYNOMENE.

Calyx bilabiate, the upper lip bifid: the lower 3-cleft.—*Corolla* inserted into the base of the calyx. *Vexilllum* nearly round; wings oblong; keel cymbiform. *Stamens* 10, diadelphous, 5 in each division. *Legume* compressed, straight, generally composed of many 1-seeded joints; joints truncate, easily separated. *Seeds* compressed; annual plants. *Leaves* unequally pinnate. *Flowers* in axillary racemes.

1. Æ. Hispida. *Stem* erect, hispid, tubercled. *Leaves* in many pairs, 20–25 with hispid petioles; leaflets linear, obtuse; stipules sub-sagittate, ovate. *Flowers* in simple racemes; calyx bilabiate deeply divided, the upper lip bi-

fid, the lower trifid. *Corolla* much larger than the calyx, showy, *Legume* very hispid, 6–10-jointed.

Yellow, tinged with red, ☺. Aug. Along rivers. 2–3 ft.

2. Æ. Viscidula. *Stem* prostrate, viscidly pubescent, slender, diffuse. *Leaflets* generally 7–9, obovate, oblique, lanceolate. *Peduncles* generally 2-flowered bracts like the stipules; calyx almost equally 5 cleft. Lomentum with 2 joints, hispid.

Genus XXXII. HEDYSARUM. (*Syn. Desmodium.*

Calyx 5-cleft, bilabiate, upper lip 2-cleft or 2-toothed; the lower lip 3-cleft or 3-toothed, usually bracteolate, bearing the corolla at its base. *Vexillum* nearly round; keel obtuse.—*Stamens* 10, sometimes partially monodelphous; but usually diadelphous. *Stigma* capitate. *Legume* composed of several 1-seeded joints, compressed. *Leaves* usually trifoliate. Herbaceous and suffructicose plants. *Flowers* becoming more or less green by age.

1. H. Nudiflorum. Stem simple, erect, pubescent, leafy at the summit. *Leaves* ternate; leaflets oval, or broad ovate, acuminate, pale beneath, slightly scabrous above. *Flowers* in an elongated loose panicle; pedicels filiform; calyx with short teeth, spreading, the lower tooth longest. *Petals* nearly equal, the vexillum marked by two dark spots at the base. *Stamens* monodelphous. *Legume* pubescent, 3–4-jointed, stiped.

Purple. 4. July—Aug. Common in rich shaded soils of middle Ga. 6–12 in.

2. H. Acuminatum. *Stem* erect, simple pubescent, leafy at the summit. *Leaves* ternate, ovate, nearly orbicular, acuminate, terminal one the broadest, on long petioles, slightly hairy. *Flowers* in a terminal panicle, with a very long naked peduncle 1–2 feet; calyx 4-toothed; petals nearly equal in length; stamens monodelphous. *Legume* with 2–4 rounded joints.

Nearly white, or pale violet. 4. June—Aug. Common in shaded places. 10–15 in.

3. H. Canescens. *Stem* erect, scabrous, branching, striate. *Leaves* ternate; leaflets ovate, tapering at the apex, pubescent on both sides, stipulate. *Flowers* in large terminal canescent panicles; calyx hairy, conspicuously bilabiate, with acute segments; corolla much larger than the calyx. *Legume* large, 3–6 jointed, scarcely stiped, truncate at each end.

Violet purple. 4. July—Aug. Moist soils, common, 3 4 ft.

4. H. Cuspidatum. *Stem* erect, glabrous towards the base, scabrous near the summit. *Leaves* ternate; leaflets ovate, acute, acuminate into a long point. *Flowers* in large, sparingly branched panicles 1–2 feet long; bracts large. *Calyx* 5 cleft, the lower segment long. *Corolla* large. *Stamens* diadelphous. *Legume* scabrous, segments nearly triangular, 3–6.

Purplish violet. 4. Aug.—Sept. Common on the banks of streams. 4–5 ft.

5. H. Viridiflorum. *Stem* erect, pubescent. *Leaves* ternate; leaflets ovate, obtuse, scabrous on the upper surface, villous beneath. *Flowers* in an elongated, naked panicle; peduncles scabrous. *Calyx* hairy, short, the lower segment longest. *Stamens* generally diadelphous. *Legume* with 3–4 oblong, triangular joints.

Purplish. 4. June to Oct. Common. 3–5 feet.

6. H. Rhombifolium. *Stem* erect, pubescent. *Leaves* ternate, somewhat coriaceous; leaflets rhomboidal, obtuse, pubescent along the veins, rugose, paler beneath. *Flowers* in compound racemes, scabrous; bracts small; calyx with the lower segment longest. *Legume* with 2–4 joints, hispid, nearly rhomboidal.

Purple. 4. Sept.—Oct. On the coast of Car. & Geo. 2–3 feet.

7. H. Glabellum. *Stem* erect, nearly glabrous. *Leaves* ternate; leaflets small, ovate, obtuse, pubescent on both surfaces *Flowers* in terminal leafy panicles; calyx with the upper lip entire. *Legume* with 3--5 reticulated rhomboidal hispid joints.

Purple. 4. Aug—Sept. Common in shady places. 2--3 feet.

8. H. Obtusum. *Stem* erect, branching, hairy towards the summit glabrous below. *Leaves* ternate; leaflets small, ovate, obtuse, often slightly cordate. *Flowers* in terminal, elongated, erect panicles; upper lip of the calyx emarginate, the lower lanceolate. *Legume* with 2--3 hispid, nearly orbicular, reticulate joints.

Purple. 4. Sept.—Oct. In dry soils, common. 2--3 feet.

9. H. Ciliare. *Stem* erect, pubescent. *Leaves* ternate, on short hairy petioles; leaflets small ovate, pubescent underneath, ciliate, somewhat coriaceous. *Flowers* in a terminal, racemose panicle. *Calyx* hairy, upper lip shortest, mostly entire. *Legumes* with 2--3 nearly round, reticulate joints.

Purple. 4. Sept.—Oct. In sandy soils. 2--3 feet.

10. H. Rigidum. *Stem* erect, much branched, with rigid pubescence towards the summit, striate. *Leaves* ternate, leaflets oblong-ovate, obtuse, ciliate, hairy underneath, petioles hairy. *Flowers* small on long, erect, paniculate racemes. *Calyx* with acute segments. *Legumes* with 2--3 hispid joints.

Purple. 4. Aug.—Sept. In dry soils. Common. 2--3 feet.

11. H. Strictum. *Stem* erect, generally simple, or branching towards the summit, slender, pubescent or glabrous. *Leaves* ternate, leaflets linear, elongated, coriaceous, reticulate, glabrous or slightly pubescent. *Flowers* in terminal or axillary racemes, few flowered on slender pedicels; upper lip of the calyx emarginate shorter than the lower. *Legume* 1--2 jointed, joints semi-obovate, hispid.

Purple, green at the base. 4. Aug.—Sept. In pine barrens. 3--4 ft.

12. H. Paniculatum. *Stem* erect, furrowed, slender, hairy towards the summit. *Leaves* ternate; leaflets oblong-lanceolate or linear-lanceolate or oval, slightly hairy, and paler beneath, margins revolute. *Flowers* in paniculate racemes, with long slender pedicels; upper lip of the calyx emarginate, much shorter than the lower. *Legume* usually 5-jointed, pubescent; joints somewhat triangular.

Purple. 4. Aug.—Sept. Common. 2--3 feet.

13. H. Rotundifolium. *Stem* angular, prostrate, hirsute, branching, geniculate. *Leaves* ternate; leaflets large, orbicular, pubescent, ciliate. *Flowers* in axillary, paniculate racemes. *Calyx* nearly equally 4-cleft. *Legumes* hispid, with 3--5 rhomboidal joints, pubescent along the margins.

Pale purple or nearly white. 4. Aug.—Sept. In dry soils, common. 2--4 ft.

14. H. Lineatum. *Stem* creeping, angled, striate. *Leaves* ternate on very short petioles; leaflets nearly round, small, almost glabrous; stipules persistent, subulate. *Flowers* in loose, terminal, elongated panicles; upper lip of the calyx 2-cleft, lower one 3-cleft with the middle segment longest. *Legumes* sessile, hispid, generally with 3 joints, which are nearly orbicular.

Pale purple. 4. Aug.—Sept. Near Culloden, Geo. 6--15 inches.

Genus XXXIII. LESPEDEZA.

Calyx 5-cleft with nearly equal segments, with two persistent bracteoles at the base. *Corolla* inserted into the base of the calyx; vexillum unguiculate oblong, or nearly round, generally with an appendage at the base; keel obtuse as long as the wings, on long claws; wings straight; stamens diadelphous; stigma capitate, *legume* lenticular, flat, unarmed, one seeded. Perennial or suffructicose plants, with ternate reticulated leaves.

(*a.*) Flowers of two kinds. *Some* with all the organs perfectly developed apparently, but seldom perfecting their fruit. *Others* perfecting their fruit, but generally destitute of corolla and stamens. Both kinds may be on the same plant; the fertile ones usually occupying a lower situation than the others.

1. L. PROCUMBENS. *Stem* procumbent, tomentose, slender. *Leaves* ternate; leaflets oval, emarginate, very pubescent. *Flowers* on axillary peduncles. *Calyx* slightly bilabiate, shorter than the corolla. *Legume* nearly round, pubescent.

Purple. 4. Aug.—Oct. In dry soils, common. 2--3 feet.

2. L. REPENS. *Stem* prostrate, nearly glabrous. *Leaves* ternate, on short petioles; leaflets obovate, eliptical, slightly pubescent on the under surface. *Flowers* on axillary filiform peduncles. *Legumes* minutely pubescent, nearly round.

Purple. 4. Aug.—Oct. In dry sandy soils. 1--2 ft.

3. L. SESSILIFLORA. *Stem* erect, branching pubescent. *Leaves* ternate; leaflets eliptic, sprinkled with hairs, mucronate. *Flowers* in small, nearly sessile clusters, sometimes in small racemes. *Calyx* hairy. *Legumes* pubescent, mucronate, ovate.

Pale violet. 4. Sept. Dry sandy soils. 2--3 feet.

4. L. STUVEI. *Stem* simple or branching, erect, pubescent. *Leaves* ternate, tomentose; leaflets oval or nearly round. *Flowers* in axillary racemes or spikes, few flowered; peduncles longer than the leaves. *Legumes* pubescent ovate a little longer than the calyx.

4. Sept. Dry sandy soils. 2--3 feet.

(*b.*) *Flowers all perfect and fertile in dense oblong or nearly glabrous spikes.*

5. L. HIRTA. *Stem* erect branching, whole plant pubescent. *Leaves* ternate, nearly sessile; leaflets nearly orbicular or obovate, covered with soft pubescence. *Flowers* in axillary, oblong spikes; peduncles long. *Calyx* hairy with narrow, lanceolate segments. *Petals* nearly equal about as long as the calyx; vexillum with a purple spot in the center. *Legume* hairy, oval, swollen.

Nearly white, or light yellowish brown. 4. Sept. Common. 3--4 ft.

6. L. CAPITATA. *Stem* erect, pubescent, scarcely branched. *Leaves* ternate on short petioles; leaflets eliptical, obtuse, pubescent. *Flowers* in dense, axillary, capitate spikes; peduncles short; calyx hairy, three nerved; vexillum with a purple spot near the base. *Legume* oval, pubescent.

White. 4. Aug.—Sept. Middle Car. & Geo. 4--6 feet.

7. L. ANGUSTIFOLIA. Similar to the preceding species, but the leaflets vary from eliptical-oblong to linear, are smaller than those of the L. Capitata.

Grows through middle and Southern Car. & Geo. 4--5 feet.

Remarks.—The two preceding Genera are exceedingly perplexing in arranging descriptions even of well known species, from the frequent variations produced by different circumstances; and were we to disregard these variations, and describe the specimens as varieties or distinct species we should multiply the species and varieties to an indefinite extent. We have given descriptions of those which are well established species. We have little doubt that there are other species, when sufficient examination shall have determined their characteristics.

GENUS XXXIV. CROTALARIA.

Calyx slightly bilabiate, 5-cleft. *Vexillum* cordate, large; keel generally acuminate; wings somewhat plicate towards the base. *Stamens* monadelphous, the tube cleft on the upper side; the 5 alternate anthers smaller. *Legume* pedicillate, turgid. *Seeds* reniform. *Herbaceous* plants with yellow flowers.

1. C. SAGITTALIS. *Stem* erect, branching, hirsute. *Leaves* simple, nearly

sessile oval or oblong-lanceolate, stipules decurrent, acuminate sagittate. *Flowers* on rather short few flowered peduncles opposite the leaves. *Corolla* about as long as the calyx or shorter. *Legume* inflated, nearly black when mature. *Seeds* small smooth and shining, when ripe rattling in the capsule. *Rattle box.*

Yellow. ☉. April—July. Common. 8--12 inches.

2. C. Parviflora. *Stem* erect, hirsute, branching. *Leaves* linear, or linear-lanceolate, nearly sessile, lower ones broader than the upper, upper stipules decurrent. *Peduncles* opposite the leaves 3--7 flowered; corolla about as long as the calyx or shorter.

Yellow. 4. April—July. In shady soils Mid. Car. and Ga. 10 -20 in.

3. C. Ovalis *Stem* diffuse, decumbent, branching, hairy. *Leaves* oval petiolate; stipules small, or wanting, slightly decurrent. *Flowers* in racemes opposite the leaves, corolla equaling the calyx. *Legume* slightly stipitate.

Yellow. 4. April—July. Common in dry sandy soils. 6--12 in.

Genus XXXV. LUPINUS.

Calyx distinctly bilabiate, upper lip usually 2-cleft, the lower entire or 3-cleft. *Vexillum* with reflexed margins; wings united at the summit; keel falcate, acuminate. *Stamens* monodelphous; alternate anthers oblong, the others round. *Legume* coriaceous, slightly compressed. Herbaceous plants with palmate or simple leaves.

1. L. Perennis. *Root* creeping. *Stem* pubescent, striate, procumbent, branching, slightly pubescent beneath. *Flowers* in long, loose racemes; upper lip of the calyx gibbous at the base, lateral segments of the lower lip setaceous. *Petals* nearly equal; vexillum spotted. *Legume* hirsute. *Wild Lupine.*

Bluish violet. 4. April—May. Common in sandy soils. 12--15 in.

2. L. Villosus. *Stem* clothed with a dense silky pubescence, decumbent. *Leaves* simple, large, lance-oblong, on long hairy petioles. *Flowers* in long dense spikes; calyx bracteolate. *Legumes* woolly, oblong 4--5 seeded.

Reddish purple. ♂. April—May. Common. 10--15 in.

3. L. Diffusus. *Stem* decumbent, diffuse, villous. *Leaves* oblong-ovate, obtuse, on short petioles destitute of hairs. Resembles in other respects the preceding species.

Blue. 4. April—May. Sand hills of Car. and Ga. 10--15 in.

Genus XXXVI. BAPTISIA.

Calyx 4–5-cleft, campanulate or bilabiate. *Vexillum* nearly orbicular, emarginate, reflexed; wings about equal in length to the vexillum, oblong. *Keel* slightly curved, scarcely as long as the wings. *Petals* slightly united. *Stamens* separate, deciduous. *Legume* stipitate, many seeded, ventricose. *Flowers* in terminal racemes, or axillary and solitary. Perennial herbaceous plants.

1. B. Perfoliata. *Stem* glabrous, somewhat branched. *Leaves* perfoliate, orbicular or oval, glaucous, entire. *Flowers* solitary, axillary, small. *Legume* large, inflated. *Seeds* small, reniform.

Yellow. 4. May—July. In dry, sandy soils, middle Car. & Ga.

2. B. Lanceolata. *Stem* pubescent, sometimes nearly glabrous, branching. *Leaves* ternate, nearly sessile; leaflets cuneate-lanceolate, obtuse, gla-

brous on the upper surface, puberulent on the lower. *Flowers* axillary, solitary, or in terminal racemes. *Legume* large, somewhat globose, or ovate-lanceolate, generally villous.

Yellow. ♃. April—May. In dry soils. Common. 2--3 feet.

3. B. Tinctoria. *Stem* glabrous. *Leaves* ternate, nearly sessile; leaflets obovate. *Flowers* in terminal racemes, few. *Legumes* small, glabrous, on long stipes. *Wild Indigo.*

Yellow. ♃. June—Aug. Common in dry soils. 1--2 feet.

4. B. Australis. *Stem* glabrous, somewhat decumbent. *Leaves* ternate, nearly sessile; leaflets cuneiform, obtuse. *Stipules* often persistent, lanceolate. *Flowers* in long racemes, large, vexillum shorter than the wing. *Legumes* large, acuminate, oblong.

Blue. ♃. June—July. In moist soils. 2--3 feet.

5. B. Villosa. *Stem* villous, pubescent, branched. *Leaves* ternate, nearly sessile; leaflets lanceolate-oblong, or slightly cuneate, pubescent when young, afterwards nearly or quite glabrous. *Flowers* in terminal elongated racemes. *Pedicels* erect. *Bracts* subulate. *Calyx* 4-cleft, with appressed hairs. *Corolla* 4-cleft. *Legumes* oblong, woolly.

Grayish. ♃. June—July. Middle Georgia. 2--3 feet.

6. B. Alba. *Stem* branching, glabrous. *Leaves* ternate, on slender petioles; leaflets lanceolate, cuneate, obtuse. *Flowers* in elongated racemes. *Pedicels* filiform. *Calyx* 4-cleft, segments short, upper one emarginate. *Legumes* cylindrical, inflated. *Seeds* small.

White. ♃. March—April. Common. 1--2 feet.

7. B. Bracteata. *Stem* pubescent, branching from the base; branches divaricate. *Leaves* ternate on short petioles or sessile; leaflets lanceolate or oblong-ovate. *Stipules* large, foliaceous, persistent. *Flowers* large, in declined, many-flowered racemes. *Pedicels* long, drooping. *Bracts* like the stipules. *Calyx* 4-cleft, the upper one broadest and emarginate. *Legume* inflated, villous.

Grayish. ♃. April—May. Middle Ga. 1--2 feet.

Remarks. The *Baptisias* are quite conspicuous among the flowering plants of the early part of summer. The B. *Tinctoria* possesses valuable properties. It is decidedly antiseptic, and, on this account, is used in cases approaching mortification; either internally or applied to the surface in the form of cataplasms, as the case requires. It is an emetic and cathartic in large doses, but in small ones is a mild laxative. The root is the part generally used, but the whole plant is said to possess similar properties.

Genus XXXVII. CERCIS.

Calyx 5 toothed, campanulate, gibbous at the base. *Petals* distinct, vexillum small within the wings; keel larger than the wings, composed of two distinct petals. *Stamens* distinct, unequal. *Legume* compressed, many seeded, oblong, acute, on a short stipe. *Trees* with simple leaves, flowering before putting forth leaves.

1. C. Canadensis. A small tree, with smooth bark, and somewhat geniculate branches. *Leaves* broad-cordate, acuminate, villous along the veins beneath. *Flowers* in axillary racemes. *Calyx* pubescent at the margin. One of the most ornamental trees of our forests. *Red-bud, Judas-tree.*

Rose color. ♄. March. Common. 15--20 feet.

Genus XXXVIII. CASSIA.

Calyx 5-sepaled; sepals slightly united at the base, generally unequal. *Petals* 5, unequal. *Stamens* unequal, the

three upper sterile. *Legume* ligneous, terete or compressed, sometimes with several transverse partitions. Mostly annual plants, with pinnate leaves.

1. C. Tora. *Stem* glabrous or slightly sprinkled with hair, branching. *Leaflets* in 3 pairs, obovate, obtuse, slightly mucronate, a little pubescent on the under surface when young, a gland between the lower pair. *Stipules* ciliate. *Sepals* obtuse, ciliate, 5-nerved. *Petals* emarginate, 3-nerved, obovate. *Stamens* shorter than the petals, unequal. *Anthers* dehiscing by two pores at the apex. *Legume* compressed, or terete, many celled by transverse partitions, long. *Seeds* numerous, reniform.

Yellow. ☉. Aug.—Oct. Common. 3–4 feet.

2. C. Occidentalis. *Stem* erect, glabrous, branching or simple. *Leaflets* in 5-pairs, occasionally 3 or 6 pairs, ovate or ovate-lanceolate, slightly ciliate, acuminate, unequal at the base, and serrulate; gland at the base of the petiole. *Flowers* in axillary racemes, few. *Legumes* long, glabrous, many seeded. *Seeds* compressed, nearly oval. *Styptic-weed.*

Yellow. ☉. July—through the summer. 4–6 feet

3. C. Marilandica. *Stem* glabrous, or covered with scattered hairs. *Leaflets* in about 8 pairs, oblong-lanceolate, slightly ciliate, mucronate; gland at the base of the petiole. *Flowers* in short, axillary racemes, numerous, paniculate at the summit of the stem. *Legumes* curved, linear, pubescent or glabrous.

Yellow. ☉. June—Aug. On the banks of streams. 3–4 feet.

4. C. Chamæcrista. *Stem* erect, or somewhat decumbent, with divaricate, hirsute, and scabrous branches. *Leaflets* in 10–15 pairs, glabrous, oblique, oval, narrow, mucronate, glaucous beneath, serrulate; petiole hirsute, with a cup-like gland near the base of the lowest pair of leaflets. *Flowers* in supra-axillary fascicles. *Stamens* all fertile, a part of the petals spotted at the base, 4 of the anthers yellow, 6 purple. *Legumes* villous, linear. The *C. Fasciculata* is considered only a variety of this; differing from it in being nearly glabrous, anthers all yellow, petals not spotted at the base.

Yellow. ☉. Aug.—Sept Common. 1–2 feet.

5. C. Nictitans. *Stem* erect or procumbent, pubescent when young, glabrous when old. *Leaflets* in 10–15 pairs, linear, mucronate, gibbous at the base; gland below the base of the leaflets. *Flowers* in supra-axillary fascicles, small: petals unequal; stamens 5, anthers purple. *Legumes* somewhat hairy, oblong, compressed.

Yellow. ☉. Aug.—Oct. Common. 1–2 feet.

6. C. Aspera. *Stem* hirsute, with spreading hairs, with erect branches. *Leaflets* numerous, in 10–15 pairs, linear-lanceolate, ciliate, gland near the base of the lowest pair of leaflets. *Flowers* on supra-axillary peduncles, generally 3 on each peduncle: stamens 7–9 unequal. *Legume* compressed, obtuse, mucronate, hirsute.

Yellow. ☉. July—Sept. Common in the low country. 1–3 feet.

Remarks. The *Cassia Marilandica*, a plant very common throughout the Southern states, and known by the name of American Senna, possesses the properties of the imported Senna, which is from plants indigenous to Egypt and Arabia, and is the product of several species of Cassia. It is a mild cathartic, owing this effect to a substance obtained by the analysis of Lassaigne, and called *Cathartin*.

Genus XXXIX. GLEDITSCHIA.

Flowers dioecious or polygamous. *Calyx* consisting 3–5–8 sepals united at the base. *Petals* equal or fewer in number to the sepals. *Stamens* generally equal the sepals, occasionally fewer by abortion. *Stigma* pubescent. *Legume* com.

pressed, stipitate. *Seeds* oval, testa crustaceous. *Trees* with pinnate leaves, and generally spiny branches.

1. G. Triacanthos. A large tree, wood hard, generally bearing compound spines. *Leaves* pinnate; leaflets lanceolate-oblong, glabrous, slightly crenulate near the summit. *Flowers* in axillary racemes. *Legumes* falcate, 12–14 inches long, slightly twisted, mucronate, many seeded. The spaces between the cells of the seed filled with a sweet pulp. *Honey Locust. Sweet Locust.*
Greenish. ♄. May. In rich soils. 50–60 feet.

2. G. Monosperma. A tree armed on the trunk and branches with spines. *Leaves* equally and compoundly pinnate; leaflets numerous, glabrous, small oval. *Flowers* in small, axillary racemes. *Legumes* oval, compressed, destitute of pulp, 1-seeded.
Greenish. ♄. July. Middle Car. & Ga., in swamps. 40–50 feet.

Sub-Order II. MIMOSEÆ.

Sepals and petals regular, the latter hypogynous. *Stamens* as many as the petals, or numerous; inserted into the base of the corolla. *Leaves* pinnate or bi-pinnate.

Genus XL. MIMOSA.

Flowers polygamous. *Calyx* 4–5-toothed, or entire, urceolate. *Petals* 4–5, united into a somewhat campanulate corolla with a 4–5-cleft border. *Stamens* 4–15, exserted, inserted into the base of the corolla, sometimes monodelphous at the base, but generally distinct. Herbaceous plant. *Flowers* in globose heads, rose color. *Leaves* pinnate, sensitive.

1. M. Strigillosa. *Stem* prostrate, diffuse, slightly prickly. *Leaves* pinnate, 10–15 pairs, leaflets oblong-linear, glabrous, with the under surface sometimes strigose, falcate. *Flowers* in heads on long peduncles. *Legumes* 1–3 jointed, when more than one jointed oblong, when 1-jointed ovate.
Rose color. ♃. July—Aug. Florida, Louisiana.

Genus XLI. SCHRANKIA.

Flowers polygamous. *Calyx* 5-toothed, minute. *Petals* 5, united into a Infundibuliform corolla. *Stamens* 8–12 distinct or monodelphous. *Legume* 1-celled, many seeded, 4-valved. Prickly, herbaceous plants, with bipinnate, sensitive leaves. *Flowers* in spherical heads, on axillary peduncles.

1. S. Uncinata. *Stem* procumbent, or running over other objects, grooved or angled. *Leaflets* numerous, oblong-oval, reticulated beneath. *Flowers* generally in solitary heads, peduncles axillary. *Legumes* rugose, acuminate, oblong-linear, somewhat 4-sided, or terete. *Seeds* eliptical.
Rose color. ♃. May—July. Common. 1–4 feet.

Remarks. A beautiful plant when cultivated and trained, its sensitive leaves and beautiful heads of pink flowers, distinguish it as a subject of attention. Its abundance, however, prevents that care being bestowed upon it which it would otherwise receive from the hand of the florist.

Genus XLII. ACACIA.

Flowers polygamous. *Calyx* 4-toothed. *Petals* slightly united at the base. *Stamens* 10, inserted into the base of the corolla. *Legume* 1-celled, many seeded. *Plants* with bipinnate leaves; leaflets numerous. *Flowers* in heads or spikes.

1. A. Lutea. *Stem* herbaceous, procumbent, unarmed, pubescent, with angular branches; stipules nearly subulate, petioles without glands. *Leaflets* linear-oblong ciliate. *Flowers* on axillary peduncles, in oblong heads; calyx deeply cleft; petals ovate acute. *Legumes* stipitate, compressed, about half an inch long.
Yellow. ♃.

Remarks.—The Order Leguminosæ is one of the most extensive and important. It yields to medicine and the arts its full proportion of the substances derived from the vegetable kingdom. In the Pea and Bean it affords two important articles of food, and in point of beauty many of its productions are scarcely rivalled. Among the most important articles of the Materia Medica derived from this Order are the gums *Tragacanth Arabic* and *Kino*, Senna, Tamarind, Catechu from a species of Acacia, Dragon's Blood, Cowhage from the Dolichos pruriens, and Balsam Copaiva, and Tolu. To the arts it affords Indigo, Logwood, Rosewood, a species of Mimosa, Sandal wood, &c. As food for men and animals, the Pea, the Bean, Clover, Lucerne, &c.

Order XLI. ROSACEÆ.

Sepals usually 5, more or less united, persistent. *Petals* 5 perigynous, occasionally absent. *Stamens* numerous, inserted into the lining of the calyx. *Ovaries* solitary, or several, sometimes united with the calyx, or with each other. *Seeds* anatropous. *Leaves* alternate, stipitate, simple or compound.

Genus I. CHRYSOBALANUS.

Calyx 5-cleft persistent, campanulate, with nearly equal segments. *Petals* 5. *Stamens* numerous, those next the ovary usually shortest and sterile; ovary sessile; ovules 2. *Fruit* a drupe, with very little pulp, 1-seeded. *Shrubs* with flowers in terminal or axillary paniculate cymes.

1. C. Oblongifolius. *Stem* slender, prostrate, branching. *Leaves* nearly sessile, oblong, or lanceolate-oblong, slightly crenulate glabrous or tomentose beneath. *Flowers* small, terminal. *Petals* nearly round. *Fruit* oblong about 1-inch in length.
White. ♄. May—June. Ga. and Ala. 1–2 ft.

Genus II. PRUNUS.

Calyx 5-parted, somewhat urceolate. *Petals* spreading, unguiculate. *Stamens* numerous. *Ovary* with 2 pendulous ovules, glabrous. *Fruit* an ovate drupe, fleshy, with a compressed nucleus, having grooved margins. Small trees and shrubs. *Leaves* with a convolute vernation, serrate. *Flowers* usually appearing before the leaves. *Plum.*

1. P. Americana. *Stem* smooth with long flexible branches, the old branches somewhat rough and thorny. *Leaves* ovate, or oblong-ovate, acu-

minate, sharply serrate, veined beneath; petioles with two glands nearly glabrous when old. *Flowers* in umbels 2--5. *Segments* of the calyx lanceolate. *Fruit* a roundish drupe, reddish when ripe, large with a tough skin. *Yellow plum. Red plum.*

White. ♄. March and April. Along the banks of streams. 15--20.

2. P. MARITIMA. A low shrub. *Leaves* oval or ovate, acuminate, finely serrate. *Umbels* few flowered. *Fruit* nearly globular, covered with bloom, red or purple, pleasant to the taste.

White ♄. March aad April. On the sea coast.

GENUS III. CERASUS.

Calyx inferior, campanulate, 5-cleft. *Petals* 5-spreading. *Stamens* numerous. *Drupe* globose, nucleus, smooth. *Leaves* conduplicate in vernation. *Cherry.*

1. C. VIRGINIANA. A tree with smooth branches, or small shrubs, with greyish bark. *Leaves* broadly oval, or oblong-lanceolate, mucronate, serrate or entire; petioles glandular. *Flowers* in axillary racemes, short, erect, segments of the calyx acute, whitish. *Petals* nearly orbicular. *Fruit* a dark red globular drupe, very astringent. *Choke Cherry.*

White. ♄. March—April. Near Columbia S. C. 10--30 ft.

2. C. SEROTINA. A large tree with spreading, smooth branches. *Leaves* oval oblong, acuminate, generally glabrous, somewhat lucid, doubly serrate; petioles glandular. *Flowers* in elongated racemes. *Petals* nearly orbicular. *Drupes* nearly black, eatable. *Wild or Black Cherry.*

White. ♄. April—May. In rich soils. 30—80 ft.

3. C. CAROLINIANA. A tree of ornamental growth. *Leaves* oblong lanceolate, slightly acuminate, mucronate, entire, or serrate-coriaceous, shining above; petioles short. *Flowers* in dense racemes, from the axils of the leaves of the preceding season. *Petals* small, obovate. *Stamens* long. *Drupe* black, persistent, dry.

White. ♄. March—April. On the Congaree, near Columbia.

GENUS IV. SPIRÆA.

Calyx 5-cleft, expanding, persistent. *Petals* 5, nearly round. *Stamens* numerous. exsert. *Carpels* 3–12, 1--3-seeded, distinct, or slightly united at the base, follicular, generally 2-valved. Shrubs or perennial herbs. *Leaves* alternate.—*Flowers* sometimes dicœcious.

1. S. OPULIFOLIA. A small shrub, with the old bark detaching itself.—*Leaves* ovate, roundish, or subcordate, 3-lobed, doubly serrate, glabrous. *Flowers* in terminal corymbs, numerous, pedicels filiform. *Carpels* 3–5 inflated. *Seeds* obovate, shining, very bitter. *Nine Bark.*

White. ♄. June—July. Mountains. 3–5 feet.

2. S. SALICIFOLIA. A shrub with slender, somewhat angular branches, and slightly pubescent. *Leaves* lanceolate, sharply serrate. *Flowers* in crowded, paniculate, terminal racemes; segments of the calyx lanceolate. *Petals* slightly unguiculate, shorter than the calyx. *Carpels* 5, glabrous, united at the base. *Seeds* numerous. *Queen of the Meadow. Meadow sweet.*

White. ♄. June—July. In wet places. 3--6 feet,

3. S. TOMENTOSA. A shrub with ferruginous, tomentose branches. *Leaves* on short petioles, ovate or oblong, unequally serrate, crowded, tomentose beneath. *Flowers* in numerous, dense, paniculate racemes. *Calyx* tomentose, with reflected segments. *Petals* small, hairy on the outer surface. *Carpels* 5, tomentose. *Seeds* few subulate. *Hardhack.*

Purple. June—July. Upper districts of Car. & Ga. 3--6 feet.

4. S. Lobata. *Stem* herbaceous, glabrous, striate, angled. *Leaves* pinnate; leaflets 5–5–7, the terminal ones large; 7–9-cleft, lateral ones 3-lobed, cuneiform lobes serrate; stipules reniform. *Flowers* in a very compound panicle. *Sepals* reflexed. *Capels* 6–8 glabrous.
Deep rose color. 4. June—August. Near the mountains. 5–8 feet.

5. S. Arvenis. *Stem* branching, herbaceous. *Leaves* tripinnate; leaflets lanceolate, oblong, acuminate, doubly serrate. *Flowers* dioecious, numerous, in paniculate spikes. *Carpels* 3–5 glabrous. *Goats Beard.*
White. 4 June—July. Mountains of Car. & Ga. 3–5 feet.

Remarks. The S. lobata is cultivated as ornaments; and the bark of the S. Tomentosa is possessed of tonic and astringent properties, and is used both in the regular practice and families where such properties are demanded. In debility it has proved very servicable. It is administered in decoction or extract.

Genus V. GILLENIA.

Calyx 5-toothed, campanulate, with the orifice contracted. *Petals* 5, inserted into the calyx, cuneate, lanceolate, very long. *Stamens* 10–15, unequal. *Carpels* 5; styles filiform; stigmas subcapitate. *Seeds* ascending, 2–4. Perennial herbs, with trifoliate leaves. *Flowers* axillary and terminal, on elongated peduncles.

1. G. Trifoliata. *Leaves* ternate; leaflets lanceolate, acuminate, serrate; stipules entire linear. *Flowers* in loose panicles, large. *Petals* long. *Seeds* exceedingly bitter. *Indian physic.*
White. 4. June—August. Upper Dist. Car. and Ga. 2–3 ft.

2. G. Stipulacea. An herbaceous plant with ternate leaves; leaflets lanceolate serrate; stipules ovate, foliaceous, large, incised. *Flowers* in loose panicles. *Carpels* 5.
White. 4. June—July. Mountains 2–3 ft.

Genus VI. GEUM.

Calyx 5-toothed, campanulate, with the orifice contracted. *Petals* 5, inserted into the calyx, cuneate, lanceolate, very long. *Stamens* 10–15, unequal. *Carpels* 5; styles filiform; stigmas subcapitate. *Seeds* ascending, 2–4. Perennial herbs with trifoliate leaves. *Flowers* axillary and terminal, on elongated peduncles.

1. G. Virginianum. *Stem* pubescent, or nearly glabrous. *Radicle leaves* ternate, or pinnate with minute lateral leaflets on long petioles. *Cauline ones* simple or variously divided or lobed, toothed or serrate, pubescent, or nearly glabrous; stipules ovate, entire or toothed. *Flowers* in erect or diverging peduncles, calyx rather longer than the petals. *Petals* cuneate-obovate.—*Carpels* somewhat hispid, with hooked arms. *White Avens.*
White. 4. July—Aug. Along streams. 1–3 ft.

Genus VII. WALDSTEINIA. (*Syn. Dalibarda.*)

Calyx 5-cleft, tubular sometimes with 5 bracteoles at the base. *Petals* 5, sessile. *Stamens* numerous inserted into the calyx. *Filaments* filiform, persistent. *Styles* long, caducous. *Carpels* 2–6, dry or fleshy, pubescent. Perennial herbs, with a creeping rhizoma. *Flowers* always yellow.

1. W. Fragarioides. *Rhizoma* thick; stem hairy. *Leaves* trifoliate; leaflets cuneiform, and generally petiolate, and incised. *Flowers* numerous on an erect scape; calyx obconic, the segments shorter than the petals; petals obovate. *Carpels* 4–6 minutely hairy.

Yellow. 4 May—June. Mountains. 4–8 in.

2. W. Lobata. *Stem* hirsute. *Leaves* generally 3–5-lobed, hirsute on the veins, pubescent beneath, somewhat cordate, nearly orbicular, incised. *Flowers* 4–8, on filiform scapes, bracteate. *Calyx* with a narrow tube, segments longer than the petals. *Petals* oval. *Carpels* generally 2, canescent.

Genus VIII. AGRIMONIA.

Calyx 5-cleft, connivent, turbinate, armed with hooked bristles. *Petals* 5. *Stamens* 11–15, inserted into the throat of the calyx. *Sepals* 2, included within the calyx. *Seeds* suspended. *Perennial* herbs with pinnate leaves. *Flowers* in racemes, yellow.

1. A. Eupatoria. *Stem* and petioles hirsute. *Leaves* pinnate the terminal leaflet petioled; leaflets 5–7, oblong, obovate coarsely toothed, pubescent, generally with several minute leaflets intermingled. *Flowers* in virgate spikes, with the calyx sulcate towards the base. *Petals* much longer than the calyx. *Fruit* hispid. *Agrimony.*

Yellow. 4. July. Common. 2–4 feet.

2. A. Parviflora. *Stem* and petioles hirsute, with brownish hairs. *Leaves* dotted on the under surface, pinnate; leaflets 11–19, crowded, with minute ones intermixed, toothed, lanceolate, acute, scabrous above, pubescent beneath; stipules incised. *Flowers* small, in virgate racemes. *Petals* small. *Dotted Agrimony.*

Yellow. 4. July—Aug. Upper districts of Car. & Geo. 4–5 ft.

3. A. Incisa. *Stem* and petioles pubescent, intermixed with hirsute hairs. *Leaves* pinnate; leaflets 3–5 pairs, intermixed with smaller ones, incised, oblong, with unequal teeth on each side, almost glabrous above, hairy beneath. *Flowers* in virgate racemes, small on short pedicels, teeth of the calyx very short.

Yellow. 4. July—Aug. Middle Geo. 1–2 ft.

Remarks.—Agrimonia Eupatoria, is said to be one of the Indian medicines for the cure of fevers. Its properties seem to be principally astringent and on account of this property is used in affections of the mucous membrane of the alimentary canal. It has also been employed in Jaundice.

Genus IX. POTENTILLA.

Calyx 4–5-cleft, with 4 or 5 exterior segments. *Petals* 4–5 ob-cordate. *Stamens* numerous, inserted into the base of the calyx. *Capsules* numerous, collected into a head. *Plants* with compound leaves.

1. P. Norwegica. *Stem* erect, hirsute, dichotomously divided. *Leaves* palmate; leaflets three, obovate-oblong, upper ones lanceolate, coarsely serrate. *Flowers* in leafy cymes; segments of the calyx longer than the petals. *Petals* obovate, emarginate. *Carpels* rugose, ribbed or striate. *Cinque foil.*

Yellow. ☉. July—Aug. Common. 8–18 inches.

2. P. Canadensis. *Stems* pubescent, sarmentose procumbent. *Leaves* palmate; leaflets 5, obovate, cuneiform silky when young, incisely toothed. *Flowers* on elongated axillary pedicels; segments of the calyx ovate, lanceolate. *Petals* obcordate. *Carpels* somewhat rugose.

Barren Strawberry. Five finger.

Yellow. 4. April—Aug. Common. 10–12 inches.

3. P. Tridentata. *Stem* branching, creeping at the base. *Leaves* trifoliate leaflets cuneiform 3-toothed at the apex shining above, pale and pubescent beneath. *Flowers* small and few. *Petals* obovate-oblong. *Carpels* nearly globular, villous.
Yellow. 4. June—July. 6–8 inches.

Genus X. FRAGARIA.

The different organs of the flower the same as in Potentilla. *Carpels* placed on an enlarged, succulent receptacle. Perennial herbs with trifoliate leaves; receptacle red, edible. *Strawberry.*

1. F. Virginiana. *Stem* stoloniferous. *Leaves* ternate coarsely toothed. *Flowers* on cymose scapes. *Calyx* spreading. *Fruit* roundish-ovoid, pitted, *carpels* imbedded in the receptacle. *Wild Strawberry.*
White. 4. April—May. In shady places.

Genus XI. RUBUS.

Calyx 5-parted, flattish at the base. *Petals* 5, deciduous. *Stamens* numerous. *Carpels* pulpy, collected on a conicle or cylindrical receptacle. Shrubby plants, and generally with prickly stems. *Flowers* white or rose color. *Fruit* eatable. Raspberry. Blackberry.

1. R. Odoratus. *Stem* hispid, shrubby, branched. *Leaves* simple, 3–5-lobed, the middle lobe elongated, acute, serrulate, toothed. *Flowers* numerous, large. *Calyx* covered with glandular hairs. *Petals* nearly orbicular. *Fruit* broad and flat. Yellowish and red. *Rose Flowering. Raspberry.*
Rose color. 5. June—July. Shady places. 3–5 feet.

2. R. Occidentalis. *Stems* shrubby, armed with hooked prickles, glaucous. *Leaves* pinnate; leaflets 3–5, ovate, acuminate, doubly serrate, tomentose beneath, lateral ones somewhat petioled. *Flowers* on 1–3-flowered axillary peduncles. *Fruit* roundish, nearly black, glaucous.
Black Raspberry. Thimble Berry.
White. 5. May—June. Mountains.

3. R. Villosus. *Stem* erect or bending, angular, armed with stout prickles curved downwards: branches villous. *Leaves* 3–5 foliate, glandular pubescent beneath; leaflets ovate, acuminate, unequally serrate the terminal one petioled. *Flowers* in racemes, sepals linear-acuminate. *Petals* spreading, obovate. *Fruit* black large. *Blackberry.*
White or rose color. 4. May—June. Common. 3–8 feet.

4. R. Hispidus. *Stem* shrubby, slender, prostrate, curved with retrorse prickles. *Leaves* persistent, 3–5 foliate; leaflets somewhat coriaceous, obovate, unequally serrate, glabrous. *Flowers* small, in corymbs, with filiform pedicels. *Sepals* spreading half the length of the petals. *Petals* obovate. *Fruit* small, black, composed of large grains, sour.
White. 4. May—June. Mountains.

5. R. Trivialis. *Stem* shrubby, procumbent, sarmentose, armed with prickles. *Leaves* persistent, 3–5 foliate; leaflets ovate, or oblong-lanceolate, acute, serrate, generally glabrous. *Flowers* 1–3 on each peduncle, large. *Petals* reflexed not half the length of the petals. *Petals* obovate, broad. *Fruit* large, black. *Low Bush—Blackberry.*
White. 5. March—May. Common.

6. R. Cuneifolius. *Stem* shrubby, erect, low, armed with stout recurved prickles. *Leaves* trifoliate; leaflets, obovate, cuneate, tomentose beneath,

somewhat coriaceous, serrate towards the apex, with revolute margins near the base. *Flowers* few on each peduncle. *Sepals* mucronate oblong, tomentose. *Petals* obovate. *Fruit* black.

White or rose color. 4. May—June. Common. 1-2 feet.

Remarks.—The genus *Rubus* affords fruit, which is much used for food and is healthy and agreeable when perfectly ripe. A jelly made from the fruit of the *R. Villosus* common Blackberry, is much esteemed as an article of diet by patients suffering under dysenteric affections. The root of this species is much valued in domestic practice in the same diseases, and is considered by many as a certain remedy. The Faculty recommend it in such affections as require vegetable astringents.

Genus XII. ROSA.

Calyx 5-cleft, tube urceolate, contracted at the summit, enclosing several distinct ovaries. *Carpels* 1-seeded, hairy, indehiscent. Shrubby plants, with pinnate leaves, with stipules adhering to the petiole.

1. R. Carolina. *Stem* erect branching, branches red, armed with stout prickles. *Leaves* pinnate, leaflets 5-9 large, oblong, lanceolate, acute, serrate pubescent beneath. *Flowers* in corymbs on short glandular peduncles. *Calyx* glandular hispid. *Petals* obcordate. *Fruit* globose. *Swamp Rose.*

Reddish. 4. July. In wet grounds 4-6 feet.

2. R. Lucidas. *Stems* glabrous, erect, colored, armed with setaceous prickles. *Leaflets* 5-9, ovate lanceolate, obtuse, serrate, glabrous and shining above, pubescent on the under surface. *Flowers* in corymbs, generally 3, segments of the calyx foliaceous, glandular-pubescent, longer than the corolla. *Petals* obcordate. *Fruit* red globose.

Reddish. 4. May—June. Common. 1-3 feet.

3. R. Parviflora. *Stem* glabrous, dotted, branches geniculate. *Leaflets* 5, the lateral ones ovate, obtuse, terminal one lanceolate, acute, glabrous or slightly pubescent on the veins beneath. *Spines* stipulate, generally straight. *Flowers* terminal, solitary or by pairs. *Calyx* hispid; segments subulate. *Petals* emarginate, obovate. *Fruit* nearly glabrous.

Red. 4. May—June. In dry fertile soils, common. 1-2 feet.

4. R. Lævigata. *Stem* glabrous, branches flexible, armed with strong recurved prickles. *Leaflets* 3-5, lanceolate, serrate, coriaceous, shining. *Flowers* solitary, terminal; segments of the calyx acuminate, unequal serrate. *Petals* obovate, obtuse, with the point crenulate. *Cherokee Rose.*

White. 4. April—May. Common. 15-20 feet.

Remarks.—The Rose has been an object of esteem in all civilized nations. The species and varieties of this genus, most of them produced by the Horticulturist, amount 4--500. As an ornamental shrub it stands unrivaled in public esteem. It yields but little to the mass of vegetable materials made subservient to the uses of man. The leaves of the Red-rose are slightly astringent and tonic but are used chiefly in infusions as a vehicle for the administration of cathartic medicines. Rose water is produced by the distillation of the Flowers of various species. The *Attar of Roses* is a volatile oil existing in very minute quantities in rose leaves, is obtained by distillation and sold at high prices as a perfume.

Genus XIII. CRATÆGUS.

Calyx 5-cleft, tube urceolate. *Petals* 5, spreading, orbicular. *Stamens* numerous. *Styles* 1-5. *Fruit* fleshy or baccate, crowned with the teeth of the persistent calyx, 1 to 5-seeded. *Seeds* bony. Thorny shrubs, with simple leaves. *Fruit* often edible. *Thorn tree.*

1. C. Crus-galli. *Stem* spiny, branching; branches geniculate, divari-

cate. *Leaves* obovate, deeply serrate, cuneiform, shining, glabrous, coriaceous, nearly sessile. *Spines* long. *Flowers* in terminal, compound corymbs; segments of the calyx linear-lanceolate, sometimes serrate. *Styles* 2. *Fruit* red.

White. ♄. May—June. Common. 10–20 feet.

2. C. Coccinea. *Stem* spiny. *Leaves* on long petioles, roundish, ovate, acutely lobed, serrate, glabrous, obtuse at the base. *Petioles* glandular. *Flowers* numerous, in corymbs. *Calyx* glandular, peduncles hairy. *Styles* 5. *Fruit* large, red, eatable. *White Thorn.*

White. ♄. May. On banks of streams. 10–25 feet.

3. C. Virens. *Stem* spiny; branches slender. *Leaves* nearly sessile, spatulate, ovate, serrate, with round lobes generally. *Segments* of the calyx with glandular serratures. *Flowers* in small corymbs. *Fruit* large globular, 3–4-seeded, red.

White. ♄. May—June. 8—14 feet.

4. C. Populifolia. *Stem* spiny glabrous with slender branches; spines large and sometimes branched. *Leaves* small, ovate, serrate, sprinkled with a few hairs, slightly lobed, cordate at the base. *Flowers* in small corymbs. *Fruit* globose, 5-seeded.

White. ♄. April. Middle and Southern Carolina and Georgia.

5. C. Punctata. A small tree, spiny or unarmed, with numerous rugged branches. *Leaves* obovate, cuneate, glabrous serrate, decurrent into a slender petiole, sometimes incised towards the apex and slated spines stout when present. *Flowers* in tomentose corymbs. *Calyx* villous. *Fruit* globose, large, tough, and pleasant to eat; dotted. *Thorn.*

White. ♄. May. Upper Dist. Car. and Ga. 12–25 ft.

6. C. Arborescens. A tree, unarmed. *Leaves* on short petioles, lanceolate, acute at each end, serrate, glabrous on the upper surface, hairy on the under at the division of the veins, *Flowers* numerous in corymbs. *Calyx* hairy. *Segments* obtuse, reflected. *Styles* 5. *Fruit* globose, small, red.

White. ♄. Ma-ch—April. Southern Ga. 20–30 ft.

7. C. Aprifolia. A spiny shrub, much branched. *Leaves* deltoid on long petioles, in fascicles, pubescent, 5–7 cleft, segments incisely lobed, serrate; spines stout. *Flowers* in simple corymbs; calyx villous; segments lanceolate reflexed; styles 2–3.

White. ♄. March—April. Common. 4–12 ft.

8. C. Cordata. A large shrub, glabrous and spiny. *Leaves* cordate-ovate, on long slender petioles, 3–5–7 lobed; lobes acuminate, acutely serrate.—*Flowers* in compound corymbs; segments of the calyx short, obtuse. *Styles* 5. *Fruit* globose small, depressed, red. *Washington Thorn.*

White. ♄. June. Mountains. 15—20 feet.

9. C. Spathulata. A small treee, somewhat spiny, glabrous. *Leaves* clustered in fascicles, with a long cuneate base, generally 3-lobed, crenate, glabrous. *Flowers* numerous in lateral corymbs. *Calyx* small, glabrous, segments ovate, obtuse. *Styles* 5. *Fruit* small, globose, red, eatable.

White. ♄. April. Common. 12–15 ft.

10. C. Æstivalis. *Stem* spiny, branching from the base. *Leaves* elipical or obovate, cuneate, on short petioles, sinuate toothed, or angled towards the summit, tomentose when young, glabrous above when old; veins beneath covered with a rusty pubescence. *Flowers* in small corymbs, glabrous. *Styles* 4–6. *Fruit* globose, large, acid red, used for tarts or preserves.

May Haw, Apple Haw.

White. ♂. Feb.—March. In wet places. 20–30 ft.

11. C. Flava. A shrub, spiny, with coarse bark. *Leaves* obovate, cuneate, acute at the base, running into a glandular petiole, glabrous, shining, incised or lobed towards the apex. *Flowers* in small corymbs; segments of the calyx serrated with globular glands. *Styles* 4–5 *Fruit* globular, yellow.

White. ♃. May. Sandy soils. 15–20 ft.

12. C. Lucida. A shrub with short spines, very strong. *Leaves* cuneate, obovate, crenate, coriaceous, lucid on short branches. *Flowers* few in sum-

ple corymbs, on small lateral branches. *Styles* 5. *Fruit* large, globose, red, 5-seeded.

White. ♄. April. Southeastern Ga. 10–12 ft.

13. C. Eliptica. A spiny shrub, with course rough bark. *Leaves* obovate or nearly round, cuneate at the base, corioceous, margined, with glandular dots, pubescent in the axils of the veins, and on the petioles, slightly lobed towards the apex. *Flowers* solitary, or in small corymbs. *Calyx* pubescent; segments incised or serrate. *Fruit* oval, large, red, 5 seeded. *Summer Haw.*

White. ♄. April. In Sandy soils. 8–12 ft.

14. C. Parvifolia. A spiny shrub, much branched; branches geniculate, and devaricate; young branches tomentose; spines numerous, long and slender. *Leaves* obovate, deeply serrate, entire at the base, tomentose. *Flowers* generally solitary, terminal. *Calyx* tomentose; segments lanceolate, incised, foliaceous, with 2 or three bracts at the base. *Styles* 5. *Fruit* large, greenish yellow, eatable. *Winter Haw.*

White. ♄. April—May. Dry soils common. 3–6 ft.

Genus XIV. PYRUS.

Calyx 5-cleft, tube urceolate. *Petals* 5, nearly round.—*Styles* usually 5. *Fruit* a fleshy pome, indehiscent. *Carpels* 2–5. *Seeds* 2 in each carpel. Trees or shrubs. *Leaves* simple.

1. P. Coronaria. A small tree, with spreading branches. *Leaves* large broad oval or ovate, sometimes sub-cordate irregularly serrate, smooth. *Flowers* in large terminal corymbs, fragrant. *Petals* somewhat unguiculate. *Fruit* globose depressed; disagreeable to the taste. *Crab Apple.*

Rose colored. ♄. April. Common. 10–20 feet.

2. P. Angustifolia. A small tree, resembling the preceding. *Leaves* oblong lanceolate, acute at the base, dentate or nearly entire, glabrous, shining above. *Flowers* in corymbs. *Fruit* small.

White. ♄. March—April. In rich soils. 10—20 feet.

3. P. Erythrocarpa. (*The Aronia Arbutifolia of Elliott.*) A shrub sparingly branched, unarmed. *Leaves* obovate acuminate, sometimes lanceolate, crenate, dentate, tomentose underneath. *Flowers* in terminal corymbs. *Calyx* campanulate, with erect, acute, glandular segments. *Petals* nearly round. *Stamens* numerous. *Fruit* small, red.

White or rose color. ♄. March. April. Common in damp soils. 3–8 ft.

Genus XV. AMELANCHIER.

Calyx 5-cleft. *Petals* 5, obovate, oblong. *Stamens* numerous, short. *Styles* 5, more or less united. Some 5–10-celled; cells 1--2-seeded; endocarp cartilaginous. Small trees or shrubs, with simple leaves.

1. A. Botryapium. A small tree. *Leaves* cordate or ovate, oblong, serrate, tomentose when young, glabrous when mature. *Flowers* in racemes. *Petals* oblong or linear-lanceolate; segments of the calyx glabrous short. *Styles* pubescent at the base. *Fruit* red, eatable.

White. ♄. Feb.—March. Common. 10–12 feet.

2. A. Rotundifolia. A small shrub. *Leaves* nearly round, acute, glabrous, sharply serrate. *Flowers* 6–10, in a raceme. *Petals* obovate small, segments of the calyx pubescent. *Fruit* black, eatable.

White. ♄. March—April. Middle Car. & Geo. 2–3 feet.

Order XLII. CALYCANTHACEÆ.

Sepals and *petals* confounded, æstivation imbricate, formed at the base into an urceolate tube; segments colored, petal-like. *Stamens* numerous inserted into the tube of the calyx; anthers adnate, extrorse. *Seeds* numerous, contained in an enlarged ventricose calyx.

Genus I. CALYCANTHUS.

Lobes of the calyx in several series, lanceolate, colored, more or less fleshy. *Stamens* numerous, outer ones fertile. *Flowers* purple, odorous when bruised.

Carolina Allspice. Sweet Shrub.

1. C. Floridus. Small shrub. *Leaves* oval or ovate-lanceolate, often pubescent beneath, acute, branchlets tomentose. *Flowers* solitary; segments disposed in two rows. *Sweet Shrub.*
Purple. ½. March—June. Shady places. 4–6 feet.

2. C. Inodorous. A shrub with glabrous, virgate branches. *Leaves* entire, acuminate, shining on the upper surface, pubescent along the veins on the under surface. *Flowers* larger than the preceding, terminal, axillary; segments in several series.
Purple. ½. March to April. Low country. 4–6 feet.

3. C. Lævigatus. *Leaves* large, oval, lanceolate, acuminate, glabrous; segments of the perianth lanceolate.
Purple. ½. March—April. Along streams. 4–6 feet.

4. C. Glaucus. A shrub with expanding branches, glabrous. *Leaves* large, lanceolate, with a long acumination, glaucus underneath; segments of the perianth lanceolate.
Purple. ½. May—June. Upper districts of Georgia. 4–6 feet.

Order XLIII. MELASTOMACEÆ.

Sepals 4, combined into an urceolate tube, cohering to the ovary. *Petals* 4, alternate with the segments of the calyx, inserted into its throat; æstivation twisted. *Stamens* 4–8. *Anthers* adnate, declined. *Ovary* 4-celled, with central placentæ; ovules numerous. *Styles* 1. *Fruit* capsular. *Seeds* numerous, minute, anatropous. *Herbs* with opposite ribbed leaves.

Genus I. RHEXIA.

Tube of the calyx ventricose at the base, narrowed above the ovary. *Petals* obovate, or roundish. *Anthers* 1-celled, with a thick connectivum. *Style* declined. *Stigma* obtuse. *Leaves* generally sessile, 3-nerved.

1. R. Mariana. *Stem* hirsute, terete, furrowed. *Leaves* lanceolate, attenuate at the base, hispid, serrate ciliate. *Flowers* axillary or terminal. *Ca-*

lyx hispid. *Petals* large, obliquely obovate, often hispid. *Anthers* long, linear, opening at the summit. *Style* longer than the stamens.
Purple. 4. June—Sept. In moist soils. 1-2 feet.

2. R. Angustifolia. *Stem* hirsute, nearly terete, much branched. *Leaves* linear, or lanceolate, somewhat clustered, attenuate at the base, slightly hispid, setaciously ciliate, serrulate. *Flowers* numerous, smaller than the preceding. *Calyx* glabrous.
Pale purple, or nearly white. 4. Damp soils. 1-2 ft.

3. R. Virginica. *Stem* square, with the angles winged, hispid, branching. *Leaves* sessile, oval, lanceolate, acute, hispid above, and on the ribs beneath, sometimes 5--7 ribbed. *Flowers* numerous, axillary, and terminal. *Calyx* hispid. *Petals* obovate, hispid externally. *Deer Grass.*
Purple. 4. July—Sept, In swamps. 2--3 ft.

4. R. Stricta. *Stem* glabrous, square, angles winged, bearded at the nodes. *Leaves* sessile, ovate, lanceolate, acuminate, setaceously serrulate, often hispid above. *Flowers* in dichotomous corymbs. *Calyx* glabrous.
Purple 4. In wet pine barrens. August—Sept. 3--4 ft.

5. R. Glabella. *Stem* glabrous, slightly furrowed, terete, simple. *Leaves* lanceolate, entire, or with few serratures at the summit. *Flowers* large. *Calyx* with glandular hairs. *Petals* large, glandular externally before their expansion. *Deer Grass.*
Purple. 4 June—Aug. Damp woods. 2-5 ft.

6. R. Ciliosa. *Stem* simple, quadrangular, glabrous. *Leaves* slightly petioled, ovate, lanceolate, serrulate, ciliate, hispid above. *Flowers* in a loose dichotomous panicle with an involucre formed by the upper pair of leaves; calyx glabrous. *Petals* nearly round.
Purple 4 June—Aug. Pine barrens. 1--2 ft.

7. R. Serrulata. *Stem* small, simple, quadrangular, glabrous. *Leaves* small, ovate or oval, glabrous, serrulate and ciliate. *Flowers* 1--3 together. *Calyx* glandular hispid.
Purple. 4 June—July. Swamps. 6--10 in,

8. R. Lutea. *Stem* hirsute, square, branching, hispid. *Leaves* linear, lanceolate, sometimes cuneate, entire. *Flowers* small. *Calyx* smooth and shining, or with a few scattered bristles. *Petals* setaceously mucronate.
Yellow. 4 Damp pine barrens. June—Aug. 12--18 in.

Order XLIV. LYTHRACEÆ.

Calyx 4-lobed, *Petals* none, or four. *Stamens* inserted into the tube of the calyx, generally in number equal to the lobes. *Anthers* short, introrse; ovary 2--4 celled, enclosed in the calyx; ovules numerous, placentæ central. *Capsule* membranaceous, sometimes 1-celled. *Seeds* numerous, anatropous. *Cotyledons* foliaceous. *Herbs* with opposite leaves, without stipules.

Genus I. HYPOBRICHIA.

Calyx 4-lobed, and sometimes with intermediate segments, campanulate. *Apetalous.* *Stamens* 2--4, ovary 2-celled, globose. *Stigma* 2-lobed, nearly sessile. *Capsule* 2-celled, membranous, dehiscing irregularly. *Seeds* numerous. An aquatic plant with opposite linear leaves. *Flowers* minute, axillary.

1 H. NUTTALLII. *Stems* leafy, immersed. *Leaves* linear, acute, the uppermost shorter and broader, obtuse. *Flowers* very small. *Stamens* 2--4 shorter than the Calyx. *Water Purslane*

☺ July—Aug. In still waters, near Culloden. 12 -20 in.

GENUS II. AMMANNIA.

Calyx 4-lobed with 4 intermediate lobes produced in the sinuses. *Petals* 4 or none. *Stamens* generally 4, sometimes 8. *Ovary* 2--4-celled. *Capsule* included in the calyx. *Seeds* numerous, herbaceous annual plants. *Stems* square; leaves opposite. *Flowers* axillary, with small petals; growing in wet places.

1. A. LATIFOLIA. *Stem* erect, branching. *Leaves* linear, lanceolate, dilated at the base, sessile. *Flowers* 1--5 in each axil. *Calyx* angled, with 4 short intermediate lobes. *Petals* 4. *Stamens* 4. *Capsule* 4-celled.

Purple. ☺ July—Aug Near Macon. 10--20 in.

2. A. RAMOSIOR. *Stem* erect, somewhat columnar, succulent glabrous *Leaves* nearly sessile, narrow, lanceolate, more or less cordate. *Flowers* axillary, the lower ones several in each axil, the upper solitary. *Petals* small. *Stamens* 4. *Capsule* globose, furrowed. *Seeds* numerous.

Pale purple. ☺ August—Sept. Wet places. 1-2 feet.

3. A. HUMILIS. *Stem* erect, quadrangular, glabrous, sometimes branched. *Leaves* lanceolate, obtuse, tapering at the base. *Flowers* solitary, axillary. *Calyx* with 4 short intermediate segments. *Petals* 4, obovate. *Stigma* capitate, nearly sessile. *Capsule* 4-celled. *Seeds* numerous.

White. ☺ On the coast. Sept. Oct. 6–10 in.

GENUS III. LYTHRUM.

Calyx cylindrical, with 4–6 short teeth, and generally with as many intermediate processes. *Petals* 4–6. *Stamens* equal, or twice as many in number as the petals, inserted into the calyx. *Style* filiform, *Capsule* 2-celled, many seeded, inclosed in the calyx. Herbaceous glabrous plants, with entire leaves.

1. L. LANCEOLATUM. *Stem* erect, quadrangular, slightly margined, branches long near the summit, slender, glabrous. *Leaves* lanceolate, acute, sessile, opposite on the stem, alternate, and crowned on the branches. *Flowers* solitary, axillary. *Calyx* furrowed. *Petals* 6-oblong, double the length of the calyx. *Stamens* 6. *Capsule* oblong.

Purple. 4. July—Aug. Ditches, swamps. 3--4 feet.

2. L. ALATUM. *Stem* glabrous, quadrangular, slightly winged. *Leaves* opposite, cordate, ovate, on short petioles. *Flowers* axillary, solitary. *Calyx* striate. *Stigma* capitate. *Capsule* cylindrical.

Bright purple. 4. June—July. Lower Georgia. 3--4 feet.

3. L. LINEARE. *Stem* glabrous, slender, virgate, branched at the summit, angular margined. *Leaves* linear, acute, generally opposite, upper ones smallest. *Flowers* axillary, solitary, small. *Calyx* somewhat striate. *Petals* 6. *Stamens* 6.

Nearly white. 4. July—Aug. On the coast. 3--4 feet.

GENUS IV. DECODON.

Calyx campanulate, with 5 erect teeth, and 5 subulate,

spreading processes. *Petals* 5, undulate. *Stamens* 10, with the alternate ones very long. *Stigma* small, on the filiform style. *Capsule* globose, 3-celled. *Seeds* numerous, minute. Perennial plant with opposite, entire leaves, and axillary flowers.

1. D. Verticillatum. *Stem* recurved, pubescent. *Leaves* lanceolate, acute, entire; a little hairy on the upper surface, tomentose on the under. *Flowers* 3 or more at the summit, of a short peduncle, rather large, showy. Purple. ♃. Aug.—Sept. In damp soils. 3–4 feet.

Genus V. CUPHEA.

Calyx tubular, ventricose, 6-toothed and generally with as many intermediate processess. *Petals* 6, unequal. *Stamens* 12 unequal. *Style* filiform. *Capsule* membranaceous, 1--2-celled. *Seeds* orbicular, compressed. Herbaceous plants, with opposite leaves; calyx colored.

1. C. Viscosissima. Plant viscid, pubescent. *Stem* erect, branching. *Leaves* opposite, ovate-lanceolate, scabrous, on slender petioles. *Flowers* solitary, on short peduncles. *Calyx* ribbed, gibbous at the base, viscid. *Petals* unguiculate. *Stamens* 12. *Capsule* oblong. *Seeds* few. Capsule opening before the seeds are ripe. Violet. ☉. July—Aug. Mountains. 12--15 inches.

Order XLV. RHIZOPHORACEÆ

Sepals united into a 4-lobed calyx. *Petals* inserted into the calyx and equaling the number of lobes. *Stamens* equal to, or several times the number of petals, ovary united to the tube of the calyx, 1--2-celled. *Fruit* 1-celled, indehiscent. *Seed* solitary, pendulous.

Genus I. RHIZOPHORA.

Tube of the calyx obovate. *Petals* oblong, emarginate, coriaceous. *Stamens* twice as many as the petals. *Anthers* nearly sessile. *Fruit* ovate, longer than the tube of the calyx to which it adheres. *Trees.*

1. R. Mangle. *Leaves* obovate-oblong. *Peduncles* 2--3 flowered, axillary. *Mangrove.* Yellow. ♄. Lousiana.

Order XLVI. ONAGRACEÆ.

Sepals united into a tubular calyx, the limb generally divided into 4 segments. *Petals* equal in number to the segments, sometimes wanting. *Stamens* inserted with the petals, and gen-

erally equaling them in number. *Anthers* introrse. *Pollen* triangular. *Ovary* cohering with the tube of the calyx, 1–2–4-celled. *Style* elongated. *Stigma* capitate or 4-lobed. *Fruit* usually capsular. *Seeds* indefinite, anatropous; albumen none, embryo straight.

Genus I. EPILOBIUM.

Calyx campanulate, segments 4-spreading. *Petals* 4. *Stamens* 8, alternate ones longest. *Anthers* eliptical, attached near the middle. *Stigma* clavate. *Capsule* quadrangular, 4-celled. *Seeds* numerous, crowned with a coma. Perennial herbs.

1. E. Coloratum. *Stem* branching, glabrous, nearly terete. *Leaves* opposite or alternate, lanceolate, serrulate, on short petioles. *Flowers* in terminal racemes, small. *Petals* 2-cleft. *Capsules* on short pedicels, slightly pubescent, linear, 4-angled. *Seed* oblong.
Purple. ♃. July—Aug. Mountains. 1-3 feet.

Genus II. ŒNOTHERA.

Calyx tubular, 4-cleft, segments reflexed. *Petals* 4-equal, obovate. *Stamens* 8-ovary, 4-celled, ovules numerous. *Stigma* 4-cleft. *Capsule* 4-valved, many seeded. Herbaceous plants with alternate leaves and axillary or terminal flowers.

1. Œ. Biennis. *Stem* herbaceous, erect, terete, generally simple, hirsute. *Leaves* alternate, pubescent, sessile, ovate-lanceolate, denticulate. *Flowers* in terminal, leafy spikes. *Calyx* longer than the ovary, thickened at the summit, segments hairy, on the outside, reflected. *Stamens* slightly declined. *Petals* obovate, emarginate. *Capsule* nearly cylindrical. *Seeds* numerous.
Evening Primrose.
Yellow. ♃. Sept.—Oct. Common. 3-8 feet.

2. Œ. Muricata. Resembles the Œ. Biennis, but with smaller flowers. *Stem* purplish, muricate. *Leaves* lanceolate. *Petals* a little longer than the stamens. *Ovaries* strigose-hirsute.

3. Œ. Grandiflora. *Stem* nearly glabrous, branching. *Leaves* ovate-lanceolate, glabrous, sometimes pubescent. *Flowers* axillary, large; tube of the calyx very long; petals longer than the stamens.
Yellow. ☉. Through the summer. Cultivated grounds. 2–3 feet.

4. Œ. Sinuata. *Stem* diffuse, pubescent, ascending or decumbent, simple, or branching from the base. *Leaves* sinuately toothed, oblong, often pinnatifid. *Flowers* axillary, solitary, sessile. *Petals* nearly obcordate. *Calyx* villous. *Capsules* cylindrical, furrowed.
Yellow, becoming rose color. ♃. May—June. Dry pastures. 1-2 ft.

5. Œ. Fruticosa. *Stem* pubescent, or nearly glabrous, branching from the base, divaricate. *Leaves* sessile, lanceolate, denticulate, acute, marked with minute linear dots. *Flowers* large, in terminal racemes; petals broadly obcordate, longer than the segments of the calyx. *Capsules* oblong-clavate, pedicellate, angled.
Pale yellow. ♃. July—Aug. Middle Ga. & Car. 1-2 feet.

6. Œ. Linearis. *Stem* pubescent, slender, generally branched. *Leaves* linear, entire, obtuse, crowded near the summit. *Flowers* in terminal corymbs;

petals larger than the stamens. *Capsules* clavate, tapering at the base into a pedicel.

Bright yellow. ☉, or ♃. April—May. Common in dry soils. 1–2 ft.

7. Œ. Glauca. *Stem* glabrous, somewhat glaucous, erect, branching above. *Leaves* sessile, ovate or oblong-ovate, denticulate. *Flowers* very showy, in short, leafy, corymbs; petals emarginate, broadly obovate, erosely crenulate at the summit, much longer than the segments of the calyx. *Capsules* winged, pedicellate, ovoid.

Bright yellow. ♃. May—July. Carolina. 2–3 feet.

8. Œ. Riparia. *Stem* slightly pubescent, slender. *Leaves* linear-lanceolate, elongated, attenuate, entire, remotely denticulate. *Flowers* in leafy, elongated racemes; tube of the calyx longer than the ovary; segments of the calyx acuminate; petals obcordate. *Capsules* oblong, clavate, 4-winged, with 4 intermediate ribs.

Yellow. ♂. June—July. In damp soils. 2–3 feet.

Genus III. GAURA.

Calyx 4-cleft, tubular, prolonged beyond the ovary, deciduous; segments reflexed. *Petals* 4, unguiculate. *Stamens* 8, somewhat declined, anthers attached near the middle. *Ovary* 4-celled, with 1–2 suspended ovules in each cell; style filiform, declined. *Fruit* somewhat ligneous, indehiscent, by abortion 1-celled, 1-seeded, 4-angled. Perennial plants, with alternate leaves. *Flowers* in terminal spikes or racemes.

1. G. Angustifolia. *Stem* terete, pubescent. *Leaves* clustered, sessile, linear, repand, undulate, denticulate, somewhat hairy. *Flowers* in terminal panicles formed of slender racemes; calyx with reflected segments; segments long, linear; petals inserted near the summit of the calyx, spatulate, obtuse, shorter than the segments of the calyx. *Fruit* ovate, with acute or winged angles.

White. ♃. July—Aug. Common. 2–3 feet.

2. G. Biennis. *Stem* villous-pubescent, branching. *Leaves* lanceolate, acute, denticulate, or entire, pubescent, sometimes glabrous above when old. *Flowers* crowded in the terminal spikes; segments of the calyx rather longer than the petals; petals spatulate, larger than the preceding. *Fruit* oval-oblong, acute at each end, with 4 conspicuous ribs.

White or red. ♂. July—Aug. Upper districts. 3–5 feet.

3. G. Filipes. *Stem* suffrutticose at the base, branching above. *Leaves* linear, or oblong-linear, acute at the base, often in the axils, remotely, sinuately toothed, often almost pinnatifid, mucronate. *Flowers* in panicles, on very slender branches, calyx hairy, with segments exceeding in length the petals; petals spatulate, oblong ovate. *Fruit* clavate, on a filiform pedicel, 4-angled.

White or reddish. ♃. July—Aug. In dry soils. 2–4 feet.

Genus IV. JUSSIÆA.

Calyx 4–6 parted; tube prismatic, or cylindrical, not extended beyond the ovary. *Petals* 4–6, spreading. *Stamens* double the number of petals. *Capsule* 4–6 celled, oblong, ribbed. *Seeds* numerous. Herbaceous plants, growing in wet places. *Leaves* alternate. *Flowers* axillary.

1. J. Grandiflora. *Root* creeping. *Stem* erect, ascending, little branch-

ed, villous when young. *Leaves* lanceolate, entire, acute at each end, nearly sessile, lower ones spatulate. *Flowers* solitary, axillary, nodding before their expansion. *Calyx* villous with very acute segments. *Petals* obovate, emarginate, double the length of the segments. *Stamens* 10, unequal. *Ovary* 5-angled.

Yellow. ♃ May—Aug. Low country. 2–3 feet.

2. J. Leptocarpa. *Stem* hirsute, erect, simple, or somewhat branched. *Leaves* lanceolate, almost sessile. *Flowers* axillary, on short pedicels. *Calyx* usually with 6 acuminate hairy lobes. *Petals* as long as the calyx. *Stamens* 10–12. *Capsules* linear, nearly glabrous when mature.

Yellow. ☉ June—Aug. Southern Georgia. 1–2 feet.

3. J. Decurrens. (*Ludwigia Decurrens of Elliott.*) *Stem* erect, glabrous, branching, winged, branches slender. *Leaves* ovate, lanceolate, decurrent, closely sessile, shining, with 2 glands at the base. *Flowers* on square winged peduncles with 2 cordate glands in the middle, segments of the calyx 4, acuminate, 5 nerved. *Petals* obovate, as long as the segments, caducous. *Stamens* 8. *Capsules* 4-seeded, winged, on short pedicels.

Yellow. ♃ July—Sept. Damp soils very common. 2–3 feet.

Genus V. LUDWIGIA.

Calyx 4-parted, tube angled or cylindrical. *Petals* 4 or none. *Stamens* 2, apex of the ovary generally flat. *Stigma* capitate. *Capsule* quadrangular, 4-celled, many seeded. Perennial plants growing in wet places. *Flowers* axillary or spicate.

1. L. Alternifolia. *Stem* erect, branching, slightly angled, slightly scabrous. *Leaves* alternate, lanceolate, sessile, tapering at each extremity. *Flowers* axillary, solitary on short peduncles; segments of the calyx, ovate, acuminate, spreading, 5 nerved. *Petals* caducous, as long as the calyx. *Capsule* with winged angles, cubical, wings ciliate.

Yellow. ♃ July—Sept. Low country. 3–4 ft.

2. L. Pilosa. *Stem* hairy, or hirsute, erect, branching. *Leaves* ovate, obtuse, upper ones lanceolate or oblong linear, sessile, somewhat decurrent. *Flowers* axillary, on short peduncles, large, segments of the calyx ovate, lanceolate, spreading. *Capsule* villous, nearly cubical, angles winged.

Yellow. ♃ August—Oct. Wet clay soils. 1–2 feet.

3. L. Virgata. *Stem* erect, virgate, slightly angled, pubescent, sometimes branched. *Leaves* ovate, or oblong, the upper linear, obtuse sessile, pubescent. *Flowers* axillary, large on slender pedicels; lobes of the calyx ovate, reflexed. *Petals* larger than the segments. *Capsule* cubical, with winged angles.

Yellow. ♃ May—Sept. In dry places. 2–4 ft.

4. L. Linearis. *Stem* erect, branching, slender, glabrous, angled near the summit. *Leaves* linear, acute at each end. *Flowers* axillary, solitary, sessile, segments of the calyx triangular, ovate. *Petals* oblong-ovate, sometimes wanting.

Pale yellow. ♃ July—Sept. In shallow water. 10–20 in.

5. L. Lenifolia. *Stem* erect glabrous, branching from the base, slender, angled above. *Leaves* linear, tapering at the base. *Flowers* axillary, sessile, larger than the preceding, lobes of the calyx ovate lanceolate. *Capsule* cylindrical, slender.

Yellow. ♃ July—Aug. Middle Georgia. 6–18 in.

6. L. Cylindrica. *Stem* erect, branching, slightly angled, glabrous. *Leaves* slightly denticulate, lanceolate, tapering at each extremity, slightly decurrent. *Flowers* small, solitary, or clustered, apetalous, sessile, segments of the calyx short serrulate. *Capsule* cylindrical, pubescent, with 4 furrows.

Yellow. ♃ July—Sept. Southern Ga. 2–3 feet.

7. L. Mollis. *Stem* erect, much branched, pubescent. *Leaves* lanceolate, pubescent, acute at each extremity. *Flowers* generally clustered, axillary, sessile, segments of the calyx acuminate, triangular, ovate. *Petals* minute or none. *Capsule* subglobose, villous, 4-sided.

Yellow. ♃ July—Sept. In swamps. 2–3 feet.

8. L. Alata. *Stem* erect, glabrous, sparingly branched, winged. *Leaves* cuneate, decurrent at the base, lower ones lanceolate or oval. *Flowers* axillary, solitary, sessile, apetalous; segments of the calyx broad triangular ovate capsules, cubical slightly winged, small.

Yellow. ♃. July—Sept. In swamps. Southern Car. & Geo. 1–3 ft.

9. L. Sphærocarpa. *Stem* erect, slightly angled, branching, glabrous or minutely pubescent. *Leaves* linear-lanceolate, acute, attenuate at the base. *Flowers* axillary generally solitary, sessile, commonly apetalous; segments of the calyx, triangular-ovate. *Capsule* small, globose, pubescent.

Yellow. ♃. July—Sept. Swampy grounds. Southern Car. & Geo. 1–2 ft.

10. L. Microcarpa. *Stem* decumbent, slightly winged, branching, glabrous, ascending. *Leaves* obovate, spatulate, acute, glabrous; obscurely denticulate. *Flowers* minute, axillary, sessile, apetalous. *Capsule* very small, 4 furrowed.

☉. Damp places. Lower Car. & Geo. 8–12 inches.

11. L. Capitata. *Stem* erect glabrous, slender, somewhat angled. *Leaves* narrow-lanceolate, obtuse at the base, sessile acute. *Flowers* in a crowded terminal head or spike, sessile. *Petals* small or none; segments of the calyx, broad triangular-ovate. *Capsule* oblong, quadrangular slightly winged.

Yellow. ♃. Aug.—Oct. Damp soils. Middle Geo. 12–15 inches.

12. L. Palustris. *Stem* procumbent, glabrous, creeping, branching, succulent. *Leaves* opposite, ovate-spatulate, entire, tapering at the base into a slender petiole. *Flowers* axillary sessile; segments of the calyx very short.

Red. ♃. Through the summer. In water.

13. L. Natans. *Stem* glabrous, somewhat fleshy, creeping or floating. *Leaves* opposite, ovate-spatulate, tapering into a petiole, lower ones nearly sessile. *Flowers* axillary, sessile; segments of the calyx triangular-ovate; petals sometimes wanting. *Capsule* quadrangular, attenuate at the base.

Yellow. ♃. July—Oct. In swamps, middle Car. & Geo.

14. L. Pedunculosa. *Stem* creeping, radicant, glabrous, branching. *Leaves* opposite, sessile, lanceolate, entire, upper surface glabrous, the under sprinkled with hairs. *Flowers* axillary, solitary, on long peduncles. *Petals* obovate, entire, caducous, segments of the calyx linear-lanceolate, acuminate, spreading. *Capsule* obconic, pubescent.

Yellow. ♃. May—June. In wet places. Stem 3–10 inches.

Genus VI. PROSERPINACA.

Calyx 3-parted, tube 3-sided. *Petals* none. *Stamens* 3. *Stigmas* papillose. *Fruit* 3-sided, 3-celled. Aquatic herbs. *Stems* creeping. *Leaves* alternate. *Flowers* axillary.

1. P. Palustris. *Root* fibrous. *Stem* herbaceous, procumbent, columnar, branching, glabrous, colored. *Leaves* sessile, lanceolate, sharply serrate, the lower ones pectinate or pinnatifid glabrous. *Flowers* 1–3 axillary, nearly sessile; segments of the calyx lanceolate persistent. *Fruit* triquetrous.

♃. April. In shallow waters.

2. P. Pectinata. *Stem* herbaceous, erect, sometimes branching, angled near the summit. *Leaves* glabrous, pectinate; segments linear-subulate. *Flowers* 1–3, nearly sessile. *Nut* triquetrous with obtuse angles.

♃. May—April. In shallow water. 2–8 inches.

Genus VII. MYRIOPHYLLUM.

Flowers perfect or moœcious. *Calyx* 4-parted. *Petals* 4 or none. *Stamens* 4–8. *Ovary* 4-celled. *Fruit* of 4 indehiscent carpels, cohering by the inner angles, adhering to the tube of the calyx. Aquatic plants. The submersed leaves pinnate with filiform segments. *Flowers* sessile, axillary, the upper staminate, the middle perfect, the lower fertile.

1. M. Verticillatum. *Stem* long, branching. *Leaves* verticillate, the upper pectinate, pinnatifid, the lower pinnate with capillary segments. *Flowers* axillary, octandrous. *Water Milfoil.*

4. July—Sept. In ponds and streams.

2. M. Heterophyllum. *Stem* thick, branching, terete, floating, the upper leaves oval, acutely serrate, sub-mersed leaves numerous, verticillate, pinnate, with setaceous segments. *Flowers* hexandrous in irregular whorls. *Calyx* with minute lobes. *Petals* minute. *Stamens* 4–6. *Carpels* roughened, cohering at the axis.

Purple. 4. June—Sept. In ponds and streams. 1–2 feet.

3. M. Scrabatum. *Stem* terete, floating, taking roots at the lower joints. *Leaves* verticillate the upper, linear, pinnatifid, the lower setaceous. *Flowers* verticillate, small sessile. *Stamens* 4–6. *Carpels* 2 ridged on the back.

Pale purple. 4. April—June. Shallow ponds. 10–12 inches.

Order XLVII. TURNERACEÆ.

Sepals 5, united into a funnel shaped tube; segments equal. *Petals* 5 equal, inserted on the calyx. *Stamens* 5, alternate with the petals. *Anthers* introrse. *Ovary* 1-celled with 3 parietal placentæ. *Ovules* numerous. *Styles* 3. *Capsule* 3-valved with loculicidal dehiscence. *Seeds* numerous. Herbaceous plants. *Leaves* simple, alternate.

Genus I. TURNERA.

Petals longer than the calyx. *Stigmas* many cleft.

1. T. Cistoides. *Stem* simple, hirsute, with bristly hairs. *Leaves* alternate, oval, obtuse, crenate, hairy, nearly sessile. *Flowers* solitary axillary; peduncles articulated towards the summit. *Petals* obovate. *Anthers* sagittate. *Capsule* globose, villous. *Seeds* reniform.

Yellow. 4. June—Sept. Barren soils. Georgia, Florida. 12–18 in.

Order XLVIII. PASSIFLORACEÆ.

Sepals 4–5 united at the base. *Petals* 4–5 inserted into the throat of the calyx, sometimes wanting. *Stamens* 4–5 monadelphous. *Anthers* introrse. *Ovary* stipitate, 1-celled, with 3–4 parietal placentæ. *Styles* 3–4 clavate, a filimentous crown inserted into the calyx within the petals. *Fruit* fleshy indehiscent. *Seeds* numerous, anatropous. Climbing herbaceous plants, with alternate leaves.

Genus I. PASSIFLORA.

Calyx 5 parted with a campanulate tube, with a filamentous crown inserted into the throat. *Petals* 5. *Stamens* 5. *Anthers* large. *Stigmas* 3 clavate. *Fruit* pulpy. *Flowers* axillary with a filamentous crown.

1. P. Incarnata. *Stem* climbing, herbaceous. *Leaves* 3-lobed, alternate, lobes oblong, acute, pubescent along the veins, petioles with two glands near the summit. *Flowers* axillary solitary, on a long jointed peduncle; tendrils axillary. *Calyx* 5 parted, pubescent. *Petals* oval oblong. Crown triple. *Fruit* oval, glabrous, eatable. *May Pop.*

White. ♃. May—July. Dry soils. 20--30 feet.

2. P. Lutea. *Stem* herbaceous slender climbing, slightly hairy. *Leaves* somewhat cordate at the base, obtusely 3-lobed at the summit, glabrous. *Flowers* by pairs on axillary peduncles. *Petals* narrow. *Fruit* dark purple.

Greenish yellow. ♃. May—July. Common. 3--10 feet.

Order XLIX. CUCURBITACÆ.

Calyx 5-toothed, the limb sometimes obsolete. *Petals* 5, distinct. *Stamens* 5 diadelphous. *Anthers* long and sinuous. *Ovary* cohering to the calyx. *Fruit* fleshy. *Seeds* anatropous, albumen none, cotyledons foliaceous. Herbaceous plants climbing by stipular tendrils. *Leaves* alternate. *Flowers* axillary.

Genus I. BRYONIA.

Flowers monœcious. *Calyx* with 5 short teeth. *Petals* 5. *Stamens* 5, triadelphous. *Style* generally 3-cleft. *Fruit* an oval berry, few seeded.

1. B. Boykinii. *Stem* climbing, pubescent, tendrils usually simple. *Leaves* cordate, 3-lobed, with the middle one longest, acuminate, denticulate, the lateral angled or 2 lobed, sterile and fertile flowers usually together, on short pedicels. *Fruit* crimson, becoming yellow. *Seeds* with 2 lateral teeth.

Greenish white. ♃. June—July. Along streams. 15--20 feet.

Genus II. MELOTHRIA.

Flowers monœcious. *Calyx* 3–5-toothed. *Petals* 5, forming a campanulate corolla, perfect flowers sometimes apetalous. *Stamens* 5 triadelphous. *Anthers* contorted. *Style* 1. *Stigmas* 3 dilated, with a cup-shaped disk surrounding the base of the style. *Fruit* a small many seeded berry.

1. M. Pendula. *Stem* running over small shrubs, branching. *Leaves* somewhat reniform, repand toothed, 5-angled or 5-lobed, middle lobe longest, mucronate, slightly hispid. *Flowers* axillary, the sterile in racemes; the fertile solitary; segments of the calyx subulate. *Corolla* with a 5-lobed border. *Stamens* short. *Fruit* small, 3-celled many seeded.

Yellowish. ♃. June—Aug. In rich soils.

Genus III. SICYOS.

Flowers monœcious. *Calyx* 5-toothed, flattish, teeth subu-

late. *Petals* 5, ovate, united, forming a rotate corolla. *Stamens* 5, cohering into a tube. *Anthers* contorted. *Calyx* in the fertile flowers campanulate. *Petals* forming a campanulate corolla. *Ovary* 1-celled. *Ovule* 1. *Style* 1. *Stigmas* 3. *Fruit* ovate, usually hispid. Sterile and fertile flowers together on the same axil, the former in racemes, the latter in clusters. Petals with green veins, tendrils compound.

1. S. Angulatus. A small procumbent vine, viscidly pubescent. *Leaves* alternate, cordate, 5-angled, toothed, scabrous, palmately veined; tendrils 3–5 cleft, sterile flowers in racemose corymbs, on long peduncles. *Fruit* viscidly pubescent with introrsely scabrous, bristles.

White. ☉ June—September. Upper districts of Carolina and Georgia.

Genus IV. CUCURBITA.

Flowers monœcious. *Calyx* campanulate, 5-toothed; segments subulate, or rather broad. *Petals* obovate, inserted within the margin of the calyx. *Stamens* 5, tridelphous. *Anthers* long, tortuous, fertile flowers, with 3 nearly sessile, thick stigmas. *Fruit* large. *Seeds* numerous, compressed.

1. C. Lagenaria. A large vine, tomentose. *Leaves* cordate, nearly circular, pubescent, with 2 glands at the base, tendrils 3–4-cleft. *Flowers* solitary, axillary. *Petals* spreading. *Fruit* varying in form, exterior coat ligneous. *Calabash or Gourd.*

White. ☉. Through the summer. Rich soils.

Order L. CACTACEÆ.

Sepals numerous, indefinite, confounded with the petals, imbricate. *Petals* numerous, indefinite, arising from the orifice of the calyx. *Stamens* numerous, indefinite, with long, filiform filaments, and versatile, ovate anthers. *Ovary* 1-celled, cohering to the calyx, with parietal placentæ, fleshy. *Fruit* 1-celled, many seeded, succulent. *Seeds* anatropous, with no albumen. Succulent plants, generally destitute of leaves. *Flowers* sessile.

Genus I. CACTUS.

Sepals numerous, adhering to the ovary. *Petals* numerous, obovate, spreading. *Stamens* numerous, shorter than the petals. *Stigmas* numerous, thick. Berry 1-celled, tuberculate, many seeded.

1. C. Opuntia. *Stem* prostrate, creeping, joints compressed, obovate, spine setaceous. *Flowers* sessile on the margins of the articulations. *Fruit* obovate, pulpy. *Seeds* numerous, embedded in a crimson pulp.

Yellow. 4. Through the summer. Common.

Order LI. CRASSULACEÆ.

Calyx 4–5-cleft, persistent. *Petals* 4–5, with as many hypogynous scales at the base of the ovary. *Ovarys* 5, generally distinct. *Ovules* numerous. *Carpels* many seeded, opening by the inner suture. *Seeds* anatropous. Succulent plants.

Genus I. SEDUM.

Calyx 5-cleft, inferior. *Corolla* 4-petaled. *Stamens* 10. *Styles* 5. *Capsules* 5, with 5 nectariferous scales at the base of the germ.

1. S. Telephioides. *Stem* erect, branching. *Leaves* broad-lanceolate, alternate at the base, glabrous, toothed. *Flowers* in terminal corymbs, dense. *Stamens* 10. *Petals* ovate-lanceolate. *Live forever.*
Pale purple. ♃. June—Aug. Mountains. 1 foot.

2. S Ternatum. *Stem* creeping, branching from the base. *Leaves* flat, glabrous, entire, the lower ones verticillate by threes, broad, cuneiform, obovate, the upper ones sessile, oval or lanceolate. *Flowers* in a three spiked cyme. *Stamens* 8, with the exception of the terminal ones, which has 10. *Petals* linear-lanceolate, acute. *Stone crop.*
White. ♃. May—June. Mountains.

3. S. Pulchellum. *Stem* glabrous, assurgent. *Leaves* linear, flattish, obtuse, scattered, sessile numerous. *Flowers* in a many spiked cyme, crowded unilateral, sessile, octandrous, terminal one commonly decandrous. *Sepals* lanceolate, obtuse. *Petals* lanceolate, acute.
Purple or rose color. ♃. May—June. Mountains. 4–12 inches.

Genus II. DIAMORPHA.

Sepals 4, united at the base, obtuse. *Petals* 4, concave.—*Stamens* 8, with purple, nearly round, anthers. *Carpels* 4, with minute, obcordate scales at their base. *Seeds* 4–8. A succulent, biennial herb, branching from the base.

1. D. Pusilla. *Leaves* alternate, oblong, nearly terete. *Flowers* small, in corymbose cymes. *Fruit* not dehiscing, by either sutures.
White. ♂. March. On flat rocks, upper part of Georgia.

Genus III. PENTHORUM.

Calyx 5-cleft. *Petals* 5 or more. *Stamens* 10. *Carpels* 5, united, into a 5-angled, 5-celled capsule with 5 diverging beaks. *Seeds* minute, numerous. Perennial plants, with alternate, serrate leaves.

1. P, Sedoides. *Stem* branching, terete at the base, angled above. *Leaves* lanceolate, nearly sessile, glabrous, doubly serrate. *Flowers* in paniculate spikes. *Calyx* with ovate serrate segments. *Seeds* eliptical. *Virginia Stone-crop.*
Greenish Yellow. ♃ July—Sept. Wet places. 1–2 ft.

Order LII. SAXIFRAGACEÆ

Sepals 4–5, united or distinct. *Petals* as many as the sepals. *Stamens* usually as many as the petals, inserted with the petals into the calyx. *Ovary* of 2–5 carpels either free from, or cohering to the calyx, 1-celled with parietal placentæ, or with as many cells as carpels, with central placentæ. *Ovules* usually numerous. *Fruit* a capsule, and generally with a septicidal dehiscence. *Seeds* anatropous, numerous and small. *Embryo* straight.

Genus I. SAXIFRAGA.

Sepals 5, more or less united. *Carpels* 2-beaked, 2-celled, many seeded, free or attached to the calyx, opening by a hole between the beaks.

1. S. Leucanthemifolia. *Stem* with viscous hairs. *Leaves* spatulate, oval, attenuate into a long marginal petiole, with acute and large teeth. *Flowers* in a long diffuse much branched panicle. *Calyx* reflexed, persistent. *Petals* unequal

White, variegated with pink and yellow. ♃ June—Sept. Upper Dist. Car. and Ga. 10–20 in.

2. S. Virginiensis. *Stem* pubescent. *Leaves* oblong, ovate, or spatulate, obovate, attenuate into a broad petiole. *Flowers* in dense, cymose clusters. *Calyx* with erect segments, obtuse. *Petals* oblong, obtuse. *Carpels* united by the base to the calyx.

White tinged with purple. ♃ Mountains. 4–12 in.

Genus II. BOYKINIA.

Calyx turbinate, or urceolate, cohering to the ovary, 5-cleft, segments acute, triangular. *Petals* 5, entire. *Stamens* 5. *Styles* 2–3, short. *Capsule* 2–3-celled, with a central placentæ, many seeded, 2-beaked, dehiscent by pores between the beaks. Perennial plants, with alternate, lobed, and palmately round leaves. *Flowers* in corymbose cymes, small.

1. B. Aconitifolia. *Stem* glandular. *Leaves* 5–7-lobed, glabrous, cyme fastigiate, viscid. *Flowers* secund. Teeth of the calyx broadly triangular, 3 nerved. *Petals* longer than the calyx, obovate, sometimes wanting.

White. ♃ June—July. Mountains.

Genus III. HEUCHERA.

Calyx 5-parted campanulate, with obtuse segments. *Petals* 5-entire. *Stamens* 5. *Styles* 2. *Capsule* 1-celled, many seeded, 2-beaked, dehiscent between the beaks. *Seeds* oval hispid. Perennial herbs with numerous palmately veined, radical leaves, on long petioles.

1. Americana. *Stem* somewhat viscid, generally naked. *Leaves* 7–9 lobed, lobes rounded, obtuse, dentate, teeth mucronate, ciliate. *Flowers* nu-

merous in loose elongated panicles, bracteate. *Petals* spatulate, small. *Seeds* small numerous. *Alum root.*

White. 4 April—May. Rich damp soils common. 1–2 feet.

2. H. Caulescens. *Scape* hairy at the base, 2-leaved or naked. *Leaves* cordate, 5–7-lobed, lobes acute, glabrous, unequally toothed, ciliate. *Flowers* in slender, loose panicles. *Petals* linear spatulate, about the length of the stamens, segments of the calyx short hairy.

White. 4 May—June. Mountains.

3. H. Hispida. *Scape* glabrous, 1–2-leaved. *Leaves* obtusely 5–7 lobed, with broad mucronate, teeth, hispidly ciliate, upper surface hispid, lower glabrous. *Flowers* few. *Petals* unguiculate, broadly spatulate. *Stamens* exserted.

Violet purple. 4 May—June. Mountains.

Genus IV. ASTILBE. (*Tiarella of Elliott.*

Calyx campanulate, 5-parted persistent. *Petals* 5, inserted on the calyx, spatulate, marcescent. *Stamens* 10, exserted. *Anthers* cordate, 2-celled on subulate filaments. *Capsule* 2-celled, dehiscing longitudinally along the inside of the carpels, which separate after maturity. Perennial plants, with compound leaves, leaflets serrate. *Flowers* in crowded panicles, bracteate.

1. A. Decandra. *Stem* herbaceous, angular, branching. *Leaves* biternate, leaflets cordate, oblique, lobed, lobes serrate, lower surface and petioles glandular, pubescent. *Flowers* in axillary and terminal panicles; segments of the calyx ovate. *Petals* linear-spatulate, longer than the calyx. *Carpels* united at the base.

Yellowish white. 4 June—Aug. Mountains.

Genus V. CHRYSOSPLENIUM.

Calyx 4-cleft; segments obtuse, colored within. *Petals* none. *Stamens* 8–10, filaments short, subulate. *Anthers* reniform, 2-celled. *Styles* 2. *Capsule* 1-celled, with 2 parietal placentæ, cohering to the tube of the calyx. *Seeds* numerous. Herbaceous plants, with fleshy crenate leaves.

1. C. Americanum. *Stem* slender, decumbent, dichotomous above. *Leaves* roundish-ovate, crenate, the upper ones alternate, the lower ones opposite. *Flowers* sessile, scattered. *Seeds* hispid, reddish brown. *Water Carpet. Golden Saxifrage.*

Yellowish green. 4. April—May. Mountains.

Genus VI. LEPUROPETALON.

Calyx 5-parted, with ovate obtuse lobes; tube turbinate, cohering to the lower portion of the ovary. *Petals* 5, minute, spatulate, persistent. *Stamens* 5, with short filaments. *Capsule* 1-celled, many seeded, globose. *Seeds* numerous. A small annual herb, growing in tufts. *Leaves* alternate, spatulate, entire, marked with brownish dots. *Flowers* terminal.

1. L. Spathulatum. *Stem* glabrous, somewhat succulent, slightly angled,

branching from the base. *Flowers* large for the size of the plant. *Calyx* persistent; segments ovate. *Petals* scale-like, ovate. *Capsule* 3-valved at the summit.

White. ○. March—April. Close soils. 1 inch.

Genus VII. HYDRANGEA.

Calyx 5-toothed. *Flowers* fertile, or sterile; calyx of the sterile flowers membranaceous, colored, flat, dilated; the remaining organs rudimentary, or none; tube of the calyx in fertile flowers, hemispherical, cohering to the ovary, ribbed. *Petals* 5, ovate, sessile. *Stamens* double the number of the petals. *Styles* 2. *Capsule* 2-celled, dehiscing by an aperture between the styles. *Seeds* numerous. *Shrubs* with opposite leaves, with cymose flowers.

1. H. Arborescens. *Stem* with opposite branches, pubescent when young. *Leaves* oblong-ovate, acuminate, dentate, nearly glabrous. *Flowers* in fastigiate cymes, generally fertile.

White. ♄. May—June. Mountains. 6–8 feet.

2. H. Cordata. Resembling the preceding species. *Leaves* broad-ovate, slightly cordate at the base, acuminate, coarsely toothed, glabrous underneath. *Flowers* generally in radiate cymes.

White. ♄. May—June. Mountains. 6–8 feet.

3. H. Nivea. *Leaves* ovate, cordate, acuminate, serrate, pubescent along the veins on the upper surface, silvery, tomentose beneath. *Flowers* in terminal radiate cymes, with few sterile florets in the circumference; by cultivation all become sterile.

White. ♄. May—June. Upper Car. & Ga. Near Greenville. 6–8 ft.

4. H. Quercifolia. A showy shrub. *Leaves* deeply 3-5 lobed, serrate, tomentose beneath. *Flowers* in paniculate, radiate cymes, sterile flowers large, numerous.

White, becoming purple. ♄. May—June. Middle Ga. Common on the banks of the Ocmulgee and Flint rivers.

Genus VIII. DECUMARIA.

Calyx 8–12 cleft, tube campanulate, adhering to the ovary *Petals* 8–12, narrow, oblong, with margins somewhat induplicate. *Stamens* 3 times the number of the petals. *Capsule* 5–10-celled, ribbed, opening between the ribs; placentæ central. *Seeds* numerous. A shrub with opposite leaves. *Flowers* in compound cymes, fragrant.

1. D. Barbara. *Stem* climbing by rootlest large trees. *Leaves* broadly ovate, slightly serrate, acute at each end, or obtuse at the base. *Flowers* in corymbose panicles.

White. ♄. July. In middle Georgia. 20–40 feet.

Genus IX. PHILADELPHUS.

Calyx 4..5-parted, persistent, tube adhering to the ovary. *Petals* 4–5, broadly obovate. *Stamens* numerous. *Styles* 4,

more or less united. *Capsule* 4–5-celled, with a loculicidal dehiscence. *Seeds* numerous. *Shrubs* with opposite leaves.

1. P. Inodorus. *Stem* glabrous. *Leaves* ovate, acuminate, 3-nerved, nearly entire. *Flowers* at the extremity of the branches 1–3; segments of the calyx acute. *Petals* large.
White. ♄. May. Middle Geo. Near Culloden. 5–7 ft.

2. P. Grandiflorus. A shrub with long, flexible branches, slightly angled. *Leaves* ovate, acuminate, denticulate, 3-nerved. *Flowers* at the extremity of the branches, 1–3 large; segments of the calyx, ovate, lanceolate, acuminate. *Petals* large, twice as long as the stamens.
White. ♄. April—May. Middle Geo. Common. 6–10 ft.

Order LIII. HAMAMELACEÆ.

Calyx 4–5-cleft or with 5–7 obscure teeth, the tube somewhat adhering to the ovary. *Petals* 4–5 linear, spiral at the apex, sometimes none. *Stamens* twice the number of the petals, or indefinite. *Capsule* ligneous, 2-beaked, 2-celled, dehiscent at the summit. *Seeds* anatropous. *Shrubs* with alternate leaves, feather veined.

Genus I. HAMAMELIS.

Calyx 4-parted, with 2–3 bracts at the base. *Petals* 4 marcescent. *Stamens* 4 that are fertile, and 4 sterile, the latter opposite the petals. *Styles* 2. *Capsule* bony, cohering at the base to the calyx, 2-celled. *Seeds* one in each cell, shining.

1. H. Virginica. *Stem* with flexuous branches. *Leaves* obovate, cordate, acutely toothed, slightly scabrous, margins undulate, on short petioles. *Flowers* axillary in clusters. *Witch Hazel.*
Yellow. ♄. Oct.—Nov. Common on the margins of rivulets. 8–12 ft.

Genus II. FOTHERGILLA.

Calyx 5–7-toothed campanulate. *Petals* none. *Stamens* numerous, inserted on the margin of the calyx. *Ovary* cohering to the base of the calyx. *Styles* 2, filiform, distinct. *Capsule* 2-lobed, opening at the top, 2 celled. *Seed* one in each cell, bony. *Flowers* in terminal, amentaceous spikes.

1. F. Alnifolia. A shrub with virgate branches. *Leaves* oval, acute, or obtuse, crenate near the summit, pubescent underneath. *Flowers* with imbricated bracts, each enclosing a single flower. *Stamens* numerous, long, white, or tinged with pink.
White. ♄. March—April. Margin of Swamps. 2–4 feet.

Order LIV. UMBELLIFERÆ.

Calyx adhering to the ovary. *Limb* 5-toothed or entire. *Petals* 5, usually inflexed at the point. *Stamens* 5, alternate with

the petals. *Ovary* consisting of 2 united carpels, covered by the coherent calyx, 2-celled, an ovule in each cell. *Styles* 2. *Fruit* consisting of 2 carpels, adhering to a common axis, indehiscent; marked with 5 longitudinal ribs. *Seeds* anatropous embryo minute. Herbaceous plants with fistular stems. *Leaves* compound, with sheathing petioles. *Flowers* in umbels.

Genus I. HYDROCOTYLE.

Margin of the calyx obsolete. *Petals* entire, ovate, acute. *Fruit* flattened laterally, 5-ribbed. Herbaceous plants, aquatic, creeping stems and peltate or cordate leaves. *Flowers* in simple umbels. Involucre 4 leaved.

1. H. Americana. *Stem* glabrous. *Leaves* orbicular reniform, slightly 7-lobed, crenate. *Flowers* few, sessile in axillary umbels.
White or greenish. 4. May—June. Mountains. 2–3 inches.

2. H. Interrupta. *Stem* terete, glabrous, creeping, branching. *Leaves* peltate, orbicular, doubly crenate. *Flowers* in small nearly sessile capitate umbels, 4–8-flowered. *Fruit* broad.
White. 4. Through the summer. In wet soils. 3–4 inches.

3. H. Umbellata. *Stem* glabrous, creeping or floating. *Leaves* peltate, crenate, emarginate at the base. *Umbels* many flowered on long peduncles. *Fruit* somewhat tumid. *Calyx* slightly toothed.
White. 4. Through the summer. Grows in bogs. 4–6 inches.

4. H. Repanda. *Stem* creeping. *Leaves* cordate, rounded, repandly toothed, hairy when young. *Flowers* in capitate umbels, 3–4-flowered. *Fruit* reniform, 4-ribbed on each side, involucre 2 concave bracts.
White. 4. Through the summer. Damp soils.

5. H. Ranunculoides. *Stem* creeping or floating, glabrous. *Leaves* reniform, 3–5-lobed, crenate. *Umbels* 5–10-flowered on peduncles shorter than the petioles. *Fruit* orbicular, smooth, obscurely 2-ribbed on each side.
White. 4. July—Aug. Around ponds.

Genus II. CRANTZIA.

Calyx with a subglobose tube, margin obsolete. *Petals* roundish, entire, obtuse. *Fruit* subglobose nearly orbicular. *Carpels* unequal, small, glabrous, creeping plant with linear, entire, succulent leaves. *Umbels* few flowered, simple.

1. C. Lineata. (*Hydrocotyle Lineata of Elliott.*) *Leaves* erect, 1–2 inches long, marked with transverse lines, cuneate, linear, obtuse. *Umbels* 8–12 flowered. *Involucre* 5–6 leaved.
White. 4 April—May. Low country.

Genus III. SANICULA.

Calyx with 5 somewhat foliaceous teeth. *Petals* obovate, erect, with a long inflexed point. *Carpels* clothed with hooped bristles, without ribs. *Seeds* hemispherical. Radical leaves on long petioles.

1. S. Marilandica. *Stem* terete, glabrous, dichotomously branched towards

the summit. *Leaves* digitately 5-parted; segments incisely serrate, the middle lobe distinct to the base, lateral ones slightly confluent at the base. *Flowers* in somewhat capitate umbels, a part sterile, fertile ones nearly sessile; tube of the calyx echinate. *Fruit* oval. *Seed* flat on one side.

White. 4 May—Aug. Damp soils, common.

Genus IV. ERYNGIUM.

Flowers capitate. *Calyx* with a roughened tube, with somewhat foliaceous lobes. *Petals* oblong, ovate, emarginate, with a long inflexed point. *Fruit* obovate, crowned. *Carpels* semi-terete. *Flowers* bracteate, the lower large, the others intermixed with the flowers, small, scale-like.

1. E. Aquaticum. *Stem* glabrous, fistular, small. *Leaves* broadly linear, remotely ciliate, with soft spines. Floral leaves undivided, equal, ovate, acuminate. *Flowers* in heads. *Petals* chaffy. *Button snake-root.*

White. 4 June—July. Damp soils.

2. E. Virginianum. *Stem* glabrous, fistular, branched, thickened at the joints. *Leaves* long, lanceolate, incisely serrate, tapering at each extremity with prominent midrib. *Flowers* in numerous heads. *Involucre* long, subulate, sessile, whitish on the under surface.

White. 4 June. Damp soils. 4–6 feet.

3. E. Aromaticum. *Stem* branching towards the summit, leafy, many from each root. *Leaves* pinnately parted, crowded on the stem, bristly, with a silvery cartilaginous margin. *Flowers* in numerous heads on long peduncles. *Involucre* 5-leaved, leaves 3-cleft.

White. 4 August—Nov. Pine barrens Florida.

4. E. Virgatum. *Stem* erect or decumbent, glabrous fistular. *Leaves* spatulate, ovate, membranaceous, cauline ones on short petioles, toothed, or sharply serrate. *Involucre* 6–8 leaves, longer than the head; chaff bicuspidate. *Flowers* in heads in the angles of the branches near the summit.

Pale blue. 4 July—Sept. In pine barrens. 1–3 feet.

5. E. Baldwinii. *Stem* prostrate, often creeping, branching, filiform. *Leaves* oval or ovate, petiolate, entire, or somewhat lobed, remotely toothed; upper ones usually sessile, 3-cleft, with narrow entire, lateral segments; middle segment entire, or 2–3 toothed. *Flowers* in small heads on axillary peduncles, with the involucre shorter than the heads.

White. 4 June—July. Southern Ga.

Genus V. HELOSCIADIUM.

Calyx with an obsolete, or 5-toothed margin. *Petals* ovate, entire. *Carpels* with 5 prominent ribs. *Fruit* compressed, laterally ovate-oblong. Herbaceous plants, with compound or many parted leaves.

1. H. Nodiflorum. *Stem* procumbent, striate. *Leaves* pinnate; segments oblong, serrate; upper ones sometimes ternate, with acute leaflets. *Flowers* in umbels opposite the leaves, generally destitute of an involucre, sessile, or on short peduncles; petals expanding, acuminate.

White. ☺ April—June About Charleston in wet places. 2 feet.

2. H Leptophyllum. *Stem* glabrous, slender, erect or diffuse. *Leaves* ternate with linear segments; cauline ones sessile or nearly so. *Umbels* opposite the leaves, subsessile, involucre none. *Fruit* small glabrous.

White. June—July. Louisiana. 6–24 in.

Genus VI. DISCOPLEURA.

Calyx with subulate teeth, persistent. *Petals* ovate entire, with a minute inflexed point. *Fruit* ovate. *Carpels* 3-ribbed. *Seeds* somewhat terete. Annual, glabrous plants, with dissected leaves.

1. D. Capillacea. *Stem* geniculate, slightly angled and furrowed, glabrous. *Leaves* alternate, ternately dissected; segments capillary, spreading. *Flowers* in compound umbels. *Involucre* many leaved, shorter than the rays of the umbel; involucel many leaved, linear, unequal. *Petals* ovate, acute. *Anthers* purple. *Seeds* flat on one side, furrowed on the other.
White. ☺ May—June. 1-2 feet.

2. D. Costata. *Stem* branching towards the summit, slightly angled, glabrous. *Leaves* very compound; leaflets parted to the base, somewhat verticillate. *Umbels* terminal, large; 10-12-leaved, dissected, involucel, many leaved, as long as the pedicels. *Petals* acuminate. *Seeds* glabrous, ribbed.
White. ○. Oct—Nov. Swamps on the Ogechee. 4-5 feet.

3. D. Nuttalii. *Stem* erect, branching towards the summit. *Umbels* large; involucre half the length of the rays. *Leaves* with somewhat verticillate segments.
White. ☺. Florida.

Genus VII. LEPTOCAULIS.

Margin of the calyx obsolete. *Petals* oval, entire. *Fruit* laterally compressed, ovate. *Capsules* slightly ribbed. *Seed* flat on one side, convex on the other. Herbaceous plants, with glabrous, terete, slender stems. *Leaves* dissected with linear segments. *Umbels* opposite the leaves, and terminal, involucre none. Involucel few leaved.

1. L. Divaricatus. *Fruit* muricated, with short, somewhat appressed scales. *Leaves* alternate divided with linear segments, serrulate near the summit. *Umbel* with 5-6 unequal rays, middle one frequently sessile; involucel 3-leaved. *Petals* oval, flat.
White. ☺. March—April. Sandy pastures. 1-2 feet.

Genus VIII. CICUTA.

Margin of the calyx 5-toothed, somewhat foliaceous. *Petals* obcordate, with an inflexed point. *Fruit* laterally compressed. *Carpels* ribbed. *Seed* terete. Aquatic, perennial, glabrous herbs, with fistulous stems. *Involucre* few leaved, or none; involucels many leaved.

1. C. Maculata. *Stem* lined with green and purple, slightly geniculate. *Leaves* tri-ternate, or quinate; leaflets ovate-lanceolate, with acuminate serratures, somewhat scabrous on the under surface; petioles of the lower leaves long, sheathing, with membranaceous wings; segments of the calyx expanding. *Petals* with long inflected points.
Water Hemlock, Spotted Cow bane, Beaver poison, Mushquash.
White. ♃. July—Aug. Common.

Genus IX. SIUM.

Margin of the calyx 5-toothed. *Petals* obovate, with an

inflexed point. *Fruit* sub-globose, laterally compressed.—*Carpels* ribbed. *Seeds* nearly terete. Perennial herbs, with pinnately divided leaves. *Flowers* in many rayed umbels.

1. S. Lineare. *Stem* angular; segments of the leaves linear lanceolate, serrate. *Involucre* 5-6-leaved. *Umbels* with about 20 rays. *Petals* with an obtuse, inflexed point. *Fruit* strongly ribbed, obovate. *Water Parsnip.*
White. ♃. June—July. Florida. 2-5 feet.

Genus X. NEUROPHYLUM.

Margin of the calyx 5-toothed, persistent. *Petals* obovate, with an inflexed point. *Fruit* ovate, laterally compressed, minutely ribbed. *Seed* nearly flat on one side, convex on the other.

1. N. Longifolium. *Stem* glabrous, slender, striate above. *Leaves* ternately divided, with long, linear, entire segments, the upper ones undivided, rays of the umbel 10, slender. *Involucre* 2-4-leaved; involucels 5-6-leaved.
White. ♃. Sept. Near Macon, Ga. 3-4 feet.

Genus XI. CRYPTOTÆNIA.

Margin of the calyx obsolete. *Petals* obcordate, with an inflexed, narow point. *Fruit* linear-oblong. *Carpels* obtusely ribbed. *Seed* teretely convex on one side, the other slightly concave. Perennial herbs, with ternate leaves.

1. C. Canadensis. *Stem* erect, glabrous, with many branches; leaflets ovate, acute, sometimes notched, radical ones 2-3-lobed, serrate. *Umbels* numerous, rays unequal. *Involucre* none; involucels few leaved, small, subulate, with abortive flowers in each umbel. *Seeds* acuminate pointed, with persistent styles.
White. ♃. June—Sept. In shady, rich soils. 2-3 feet.

Genus XII. ZIZIA.

Margin of the calyx obsolete, or 5-toothed. *Petals* oblong with an inflexed point. *Fruit* compressed, roundish, or oval. *Carpels* ribbed. *Seed* convex on one side, flat on the other. Perennial herbs. *Leaves* ternately divided.

1. Z. Aurea. *Stem* erect, glabrous, terete. *Leaves* biternate; segments oblong-lanceolate, serrate, terminal one alternate at the base, serrulate, glabrous. *Umbel* 10--15 rayed, involucel of 2--3 very small leaflets. *Fruit* eliptical, nearly black when mature.
Yellow. ♃. May. Common. 1--2 feet.

2. Z. Integerrima. *Stem* glabrous, and slightly glaucous. *Leaves* 2--3 ternately divided, terminal leaflet usually 2--3-lobed; segments oblong-ovate, entire. *Umbels* on slender peduncles, with long slender rays. *Involucels* of 1--3 subulate leaflets. *Fruit* roundish-ovate, with prominent ribs.
Yellow. ♃. May—June. Common. 1--2 in.

Genus XIII. THASPIUM.

Limb of the calyx toothed, or nearly obsolete. *Petals* elip-

tical, with an alternated inflexed point. *Fruit* eliptical. *Carpels* convex, ribbed. *Seed* nearly terete. Perennial plants with ternate or biternate leaves. *Flowers* in terminal umbels or opposite the leaves. *Involucre* none; involucels lateral, 3 leaved.

1. T. Cordatum. *Stem* terete, usually glabrous. Radical leaves nearly orbicular, cordate, toothed, cauline ones ternate; segments ovate, serrate. *Carpels* with winged ribs.
Yellowish, white or purple. 4. May—June. On high lands. 1--2 ft.

2. T. Barbinode. *Stem* pubescent at the nodes. *Leaves* bi or tri-ternate; segments cuneate, ovate, unequally serrate. *Umbels* terminal, and opposite to the leaves. *Fruit* eliptical or ovate, some of the ribs only winged.
Deep yellow. 4. June. Banks of rivers. 1–2 feet.

Genus XIV. LIGUSTICUM.

Limb of the calyx toothed or obsolete. *Petals* unguiculate, obovate emarginate, with an inflexed point. *Fruit* slightly compressed or nearly terete. *Carpels* ribbed, somewhat winged. *Seeds* somewhat semi-terete. *Leaves* ternate or 2–3 ternate. *Involucre* composed of few short subulate leaflets; involucels nearly the same.

1. L. Actæifolium. (*Angelica Lucida of Elliott.*) *Root* large with a strong odor, a favorite food for hogs. *Leaves* tri-ternately divided; segments ovate, with deep serratures. *Umbels* numerous, forming a loose, naked, somewhat verticillate panicles, all but the terminal one abortive. *Fruit* ovate oblong. *White Root.*
White. 4. July. Middle Georgia. 3--6 feet.

Genus XV. ARCHANGELICA.

Limb of the calyx 5-toothed. *Petals* ovate, entire, with an incurved point. *Fruit* compressed on the back. *Carpels* with 3 dorsal ribs, with 2 marginal wings. Perennial herbs. *Leaves* bi-pinnately divided; petioles dilated at the base. *Involucre* almost wanting, involucels many leaved.

1. A. Hirsuta. (*Angelica Triquinata of Elliott.*) *Stem* pubescent near the summit, serrate; leaflets quinate; segments ovate-oblong, serrate, the upper connate. *Umbels* on long pedancles densely pubescent, rays rather long, spreading; involucels 6--10 leaved, sometimes unilateral. *Fruit* slightly winged, oblong.
White or greenish. 4. July—Aug. So. Car. and Geo. 2--5 feet.

Genus XVI. TIEDMANNIA.

Limb of the calyx 5-toothed. *Petals* ovate, with a narrow inflexed point. *Fruit* compressed on the back, obovate. *Carpels* ribbed, lateral ones dilated into a broad margin. *Seeds* flat. A biennial plant.

1. T. Teretifolia. *Stem* fistulous, erect, branching above. *Leaves* simple, terete, 4--8 inches long, divided by numerous transverse partitions, invo-

lucre many leaved, subulate, persistent; involucel similar, but smaller. *Flowers* sessile; filaments red near the summit. *Seeds* compressed.
White. ♂. Aug.—Sept. Middle Georgia. 3--6 feet.

Genus XVII. ARCHEMORA.

Limb of the calyx 5-toothed. *Petals* obcordate with an inflexed point. *Fruit* somewhat eliptic lenticularly compressed. *Carpels* ribbed, lateral ones dilated. Perennial aquatic herbs. *Involucre* wanting or few leaved; involucels many leaved.

1. A. Rigida. *Stem* erect, rigid, terete, striate fistulous. *Leaves* pinnately divided; segments ovate, oblong, remotely toothed, or entire, with a cartaliginous margin. *Umbel* of many slender rays. *Fruit* with the dorsal ribs greenish, lateral ones with a membranaceous margin.
White. ♃. Sept. Georgia—Florida. 3-5 feet.

2. A. Ternata. *Stem* striate, slender. *Leaves* ternately divided, on long petioles; segments linear, acute, entire, alternate. *Involucre* nearly wanting; involucel 5--6 leaved. *Fruit* oblong eliptic, surrounded with a thick winged margin.
White. ♃. Middle Car. & Geo. 2--3 feet.

Genus XVIII. DAUCUS.

Margin of the calyx 5-toothed. *Petals* obovate, emarginate, with an inflexed point, the exterior ones often larger, and deeply 2-cleft. *Fruit* compressed, ovate or oblong. *Carpels* with 5 filiform, bristly ribs. Biennial plants, with pinnately divided leaves.

1. D. Carota. *Root* fusiform. *Stem* hispid, branching. *Leaves* 2–3 pinnatified; segments pinnatifid, with lanceolate, cuspidate lobes. *Involucre* consisting of pinnatifid leaves, about the length of the umbel. *Umbels* concave, the central one of each secondary one abortive. *Carrot.*
Yellow. ♂. Naturalized.

2. D. Pusillus. *Stem* retrorsely hispid. *Leaves* bipinnate, with pinnatifid segments, with narrow, linear lobes; leaves of the involucre bi-pinnatifid. *Seeds* muricate, with 8 crested ribs.
Greenish yellow. ♂. May—July. Common in middle Ga. 1-2 feet.

Genus XIX. CHÆROPHYLLUM.

Limb of the calyx obsolete. *Petals* cordate emarginate, with an inflexed point. *Fruit* compressed. *Carpels* ribbed. *Seed* convex. *Leaves* compound, with toothed or many cleft segments. *Involucel* many leaved.

1. C. Procumbens. *Stem* decumbent, glabrous, small. *Leaves* alternate, bi-pinnately divided; segments pinnatifid, divisions lanceolate, mucronate. *Involucre* none. *Umbels* usually sessile, opposite the leaves, consisting of 2–4 rays; involucels 4–5-leaved. *Fruit* oblong, striate pointed at the summit.
White. ☉. April—May. Shady places. 6–18 inches.

Genus XX. OSMORHIZA.

Margin of the calyx obsolete. *Petals* oblong, with an in-

curved, cuspidate point. *Fruit* long, alternate, smooth. *Carpels* ribbed. *Seed* terete. Perennial plants, with fusiform roots.

1. O. Brevistylis. *Stem* pubescent when young, glabrous in shady places, erect. *Leaves* bi-ternate; segments oblong, serrate, sprinkled with hairs. *Umbels* opposite the leaves. *Styles* conical, short. *Fruit* tapering at the summit.

White. 4. May—June. Moist woods. 1-2 feet

Order LV. ARALIACEÆ.

Calyx obscurely 5-toothed, adhering to the ovary. *Petals* 5, æstivation valvate. *Stamens* equal in number to the petals, and alternate with them, filaments short. *Ovary* 2–3-celled, with a solitary ovule in each cell. *Styles* 2, erect, or spreading. *Fruit* drupaceous, 2–3-celled. *Seed* anatropous. Herbaceous plants with compound leaves. *Flowers* umbellate.

Genus I. PANAX.

Limb of the calyx very short. *Fruit* orbicular, or didymous. Perennial herbs, with sheathing petioles.

1. P. Quinquefolium. *Root* fusiform, wrinkled, somewhat branching, aromatic. *Leaves* verticillate at the summit of the stem, compounded of 5--7 leaflets; leaflets petiolate, obovate, acuminate. *Umbels* solitary, simple on long peduncles. *Styles* 2. *Fruit* 2-celled, red. *Ginseng.*

Yellowish green. 4. July. Mountains. 10--12 inches.

2. P. Trifolium. *Stem* herbaceous, glabrous. *Root* nearly globose, pungent to the taste. *Leaves* as in the preceding; leaflets 3--5, lanceolate, without petioles. *Flowers* sometimes dioecious. *Styles* 3. *Fruit* 3-celled. *Dwarf Ginseng, Groundnut.*

Yellowish green. 4. April. Mountains.

Order LVI. CORNACEÆ.

Calyx 4-toothed, minute, adhering to the ovary. *Petals* 4. distinct, oblong, spreading, inserted with the calyx into an epigynous disk, æstivation valvate. *Drupes* baccate, with a 1–2-celled nucleus, crowned with the calyx. *Seeds* anatropous. Trees or shrubs, with an astringent bark. *Flowers* in cymes.

Genus I. CORNUS.

Stamens 4–5, with filiform filaments. *Style* sub-clavate. *Leaves* entire, covered with appressed hairs. *Dogwood.*

1. C. Paniculata. A shrub with erect, glabrous branches. *Leaves* ovate, or lanceolate, acuminate, hairy beneath. *Flowers* in compact paniculate cymes. *Petals* lanceolate. *Drupes.* globose, depressed, white.

White. ♄. May—June. 4--6 feet.

2. C. Stricta. A shrub with opposite branches, glabrous, red, branchlets, quadrangular. *Leaves* ovate-lanceolate, acuminate, entire, nearly glabrous. *Flowers* in loose cymes. *Petals* ovate-lanceolate, acute. *Anthers* blue. *Fruit* sub-globose, pale blue, with white pulp.

White. ♄. April. Common in swamps. 8--15 feet.

3. C. Asperifolia. A shrub, with erect, pubescent branches. *Leaves* oval, lanceolate, acuminate, scabrous above, tomentose beneath. *Flowers* in fastigiate cymes, pubescent. *Petals* oblong-lanceolate, pubescent. *Anthers* blue or purple.

White. ♄ June. In dry, sandy soils. 4–10 feet.

4. C. Sericea. A shrub, with expanded branches. *Leaves* ovate, acuminate, glabrous above, silky pubescent beneath. *Flowers* in depressed woolly cymes; teeth of the calyx lanceolate. *Petals* lanceolate, obtuse. *Drupes* pale blue.

Yellowish white. ♄. June. Mountains. 5–10 feet.

5. C. Florida. A tree with expanding branches, with hard, close-grained wood, used in manufactures. *Leaves* opposite ovate, lanceolate, acuminate, entire, whitish beneath, pubescent when young. *Flowers* in terminal heads. *Involucre* conspicuous, 4-leaved. *Leaves* obcordate, nerved, white. *Calyx* tubular, 4 cleft. *Petals* 4, linear, lanceolate. *Drupe* red. *Dogwood.*

Yellowish. ♄ March—April. In rich soils.

Order LVII. LORANTHACEÆ.

Calyx attached to the ovary in fertile flowers; in perfect flowers double. *Corolla* 3–4–8 petals, distinct, or adhering to the base, æstivation valvate. *Stamens* equal in number to the petals, and opposite them, or as many as the segments of the calyx, when the corolla is wanting and inserted upon them. *Ovary* 1-celled. *Fruit* baccate, 1-celled, 1-seeded. *Seed* anatropous, cotyledons sometimes united, parasitical evergreen plants, with fleshy, coriaceous leaves. *Flowers* diœcious.

Genus I. VISCUM.

Sterile florets, with a coriaceous 4-parted calyx; segments triangular, erect. *Anthers* many celled, opening by pores, fertile flowers, with the limb of the calyx obsolete. *Petals* 4, coriaceous. *Stigma* sessile. *Fruit* pulpy, branches terete.

Misseltoe.

1. V. Flavescens. A small shrub, growing parasitically on the branches of most trees, branches opposite, or verticillate. *Leaves* cuneate, obovate, nearly sessile, 3-nerved, obtuse. *Flowers* in spikes. *Fruit* yellowish white, pellucid.

Yellowish. ♄ April—May. Common.

Sub-Class II. MONOPETALÆ or GAMOPETALÆ

Flowers in which the petals are firmly united, forming a tube of greater or less length. There are a few cases in which the petals are separate, or nearly so, as in *Mylocarium*, *Clethra*, *Cyrilla*, *Bejaria*, *Halisia*, *Diptera*, &c.

Order LVIII. PYROLACEÆ.

Calyx 5-parted, persistent, inferior. *Corolla* 4–5-toothed, with an imbricate æstivation. *Stamens* hypogynous, double in number to the segments of the corolla. *Anthers* 2-celled, appendaged at the base. *Ovary* superior, 5-celled, many seeded. *Styles* 1. *Fruit* a 5-celled capsule, with central placentæ. *Seeds* numerous, winged. Herbaceous plants.

Genus I. PYROLA.

Calyx minute, 5 parted. *Stamens* 10, slightly united at the base. *Anthers* opening by 2 pores at the base. *Corolla* rotate, 5-lobed. *Capsule* 5-celled. *Seeds* arilled.

1. P. Rotundifolia. A small creeping plant. *Leaves* nearly round, entire or crenulate, coriaceous, perennial. *Flowers* in spikes, scape triquetrous, many flowered; segments of the calyx lanceolate, acute.

Round leaved Wintergreen.

White. 4. July. Sandy soils. Near Macon.

Genus II. CHIMAPHILA.

Calyx and *Corolla* as in the preceding. *Stigma* sessile, orbicular. *Anthers* beaked. *Capsule* 5-celled, dehiscing at the angles.

1. C. Maculata. A small creeping plant. *Leaves* lanceolate, acuminate, incisely serrate, variegated in the middle with white, opposite or by threes. *Flowers* in corymbs on pubescent peduncles, fragrant, nodding.

Spotted Wintergreen.

Reddish white. 4. July. Rich, shaded soil, common. 3–4 inches.

Remarks. This plant resembles very closely the *C. Umbellata* in its sensible properties of taste and smell, and, we should presume, would have nearly the same effect on the human system. The C. Umbellata is a well known remedy under the names of *Pyrola Umbellata* and *Pipsissewa*, the latter, no doubt, its Indian name. The Indians, it is well known, highly esteemed it as a remedy in scrofula, rheumatism, &c. It is astringent, tonic and diuretic, and has been recommended in dropsy.

Genus III. MONOTROPA.

Calyx 5-parted, cucullate at the base. *Corolla* 5-petaled.

Stamens 10. *Anthers* 2-celled, appendaged at the base. *Style* 1. *Capsule* 5-valved, 5-celled, many seeded.

1. M. Uniflora. *Roots* parasitic, growing from the roots of trees, scape, erect, short, glabrous, succulent, white; bearing one flower on its summit, generally in clusters. *Leaves* merely scales, ovate, white. *Flowers* solitary, terminal. *Petals* pubescent on the inside. *Stamens* 10, unequal. *Anthers* reniform. *Seeds* numerous.

2. M. Morrisoniana. *Scape* long, straight, 1-flowered. *Flowers* erect, solitary, scales of the stem distant. *Capsule* globose.
Shady woods. Car. & Ga. Near Macon. 6--10 inches.

3. M. Lanuginosa. *Scape* bearing flowers in a spike. *Leaves* merely scales, membranaceous, sessile, crowded at the base. *Flowers* in terminal spikes, woolly. *Petals* oblong, erect, whole plant white, turning black by decay. *Indian pipe.*
White. ⊙. July. Shaded soils. 8--10 in.

Order LIX. ERICEÆ.

Calyx 4–5-cleft, nearly equal, inferior, persistent. *Corolla* hypogynous, 4–5-cleft, regular or irregular; æstivation imbricate. *Stamens* 4–10, hypogynous. *Anthers* 2-celled, separate at the apex or base. *Ovary* many celled, many seeded, surrounded by scales, or disk at the base. *Style* 1, straight. *Stigma* simple or toothed. *Fruit* capsular, with central placentæ. *Seeds* numerous, minute. *Shrubs* with evergreen, entire leaves, whorled or opposite.

Genus I. MYLOCARIUM.

Calyx 5-cleft. *Petals* 5. *Style* with winged angles. *Stigma* 3–4-cleft. *Capsule* 3-celled, angular.

1. M. Ligustrinum. A shrub. *Leaves* perennial, lanceolate, cuneate, entire, coriaceous, glabrous, alternate, sessile, somewhat glaucous underneath. *Flowers* in terminal racemes. *Calyx* small. *Petals* obovate. *Buckwheat tree.*
White. ♄. March—April. Southern Ga. & Flo. 6- 15 feet.

Genus II. ELLIOTTIA.

Calyx 4-toothed, inferior. *Corolla* 4-parted. *Stigma* capitate, or clavate, undivided.

1. E. Racemosa. A shrub with numerous, virgate branches. *Leaves* alternate, lanceolate, mucronate, entire, on short petioles, pubescent on the under surface. *Flowers* in terminal racemes. *Calyx* small. *Corolla* with the segments very slightly cohering at the base. *Stamens* 8, hypogynous.—*Anthers* sagittate.
White. ♄. June—July. Southern Georgia. 4--8 feet.

Genus III. GUALTHERIA.

Calyx 5-cleft, bracteolate. *Corolla* ovate. *Capsule* 5-celled. *Stamens* 10.

1. G. Procumbens. A very small shrub. *Stem* procumbent, branches erect. *Leaves* obovate, acute at the base, crowded towards the summit, coriaceous, with fine serratures. *Flowers* few, terminal, nodding. *Fruit* a berry, red, eatable.
White. ½. May—July. Mountains.

Genus IV. CLETHRA.

Calyx 5-parted, persistent. *Petals* 5. *Stamens* 10. *Style* 1–3-cleft at the summit, persistent. *Capsule* 3-celled, 3-valved, enclosed by the calyx.

1. C. Alnifolia. A small under shrub. *Leaves* cuneate, obtuse, acute, serrate, glabrous, of the same color on both surfaces. *Flowers* in simple, terminal racemose spikes, bracteate, tomentose. *Spiked Alder. White Bush.*
White. ½ July—Aug. Middle Carolina and Georgia.

2. C. Tomentosa. A shrub, with the young branches clothed with a stellular pubescence. *Leaves* cuneate, obovate, acute, serrate, scabrous, pubescent on the upper surface, tomentose and white underneath. *Flowers* in terminal racemose spikes, bracteate. *Petals* obovate, double the length of the calyx. *Anthers* sagittate. *Seeds* numerous, compressed.
White. ½ July—Aug. Common. 2–4 feet.

3. C. Scabra. Similar to the preceding. *Leaves* scabrous on both surfaces, with large uncinate serratures. *Flowers* in somewhat paniculate spikes, tomentose.
White. ½ July. Near Flint River, Middle Ga. 3–4 ft.

4. C. Paniculata. *Leaves* narrow, cuneate, lanceolate, acute, with acuminate serratures, glabrous on both surfaces. *Panicle* terminal, with the branches racemose, tomentose, and white. *Elliott.*

5. C. Acuminata. A small tree. *Leaves* on long petioles, oval, acuminate, serrate, glabrous, somewhat glaucous beneath. *Flowers* in racemose spikes, bracteate, with bracts longer than the flowers.
White. ½ Mountains.

Genus V. MENZIESIA.

Calyx 4-cleft. *Corolla* globose, 4–5 cleft. *Stamens* 8, hypogynous. *Styles* 1. *Capsule* 4-celled; dissepiments produced by the inflected margins of the valves. *Seeds* numerous, oblong.

1. M. Globularis. A small shrub. *Leaves* lanceolate, very pubescent when young, and glaucous beneath, except the nerves. *Flowers* globose.
Yellowish brown. ½ Mountains. 2–4 feet.

Genus VI. ANDROMEDA.

Calyx small, 5-parted, inferior. *Corolla* ovate, or cylindrical, border 5-cleft. *Stamens* 10. *Capsule* 5-celled, 5-valved; filament 1.

1. A. Calyculata. A shrub. *Leaves* oval, or lanceolate, oblong, obtuse, obsolutely serrulate, perennial, subrevolute, ferruginous beneath. *Flowers* in leafy, terminal racemes, secund; peduncles axillary, solitary; segments of the calyx acute, bracteolate. *Corolla* cylindrical.
White. ½ April—May. Mountains. 2–5 feet.

2. A. Angustifolia. Resembles the preceding. *Leaves* slightly ferrugi-

nous beneath, with revolute margins; segments of the calyx acuminate. *Corolla* oblong-oval.

White. ♄ April—May. In wet places. Middle Car. & Ga. 2–5 ft.

3. A. Nitida. A shrub, glabrous, with slender angled branches. *Leaves* oval, acuminate, entire, 3 nerved. *Flowers* clustered in the axils of the leaves, 6–10. *Calyx* purple; segments acute. *Corolla* cylindrical. *Anthers* horned at the base. *Sour wood. Sorrel tree.*

White, tinged with red. ♄ March—April. In wet lands. 3–6 ft.

4. A. Rhomboidalis. A small shrub much branched, flower bearing branches 3-angled. *Leaves* rhomboidal, lanceolate, entire, glabrous, cartilaginous, terminated by a gland. *Flowers* clustered in the axils of the leaves. *Calyx* minute. *Corolla* cylindrical, teeth small.

White. ♄ June—July. Middle Ga. & Car. 1–3 ft.

5. A. Axillaris. A shrub, with flexuous branches, terete, sparingly branched, young branches pubescent. *Leaves* lanceolate-oval, acuminate, glabrous, somewhat coriaceous, finely serrulate, paler on the under surface, sprinkled with hairs. *Flowers* in axillary racemes, numerous. *Calyx* deeply cleft. *Corolla* cylindrical-ovate, bracteas pubescent.

White. ♄ February—April. Margin of swamps. 2–4 ft.

6. A. Acuminata. A glabrous shrub, branches fistular. *Leaves* ovate-lanceolate acuminate, nearly entire, coriaceous, slightly serrate. *Flowers* in axillary racemes. *Corolla* cylindrical. *Anthers* gibbous at the base.

White. ♄. April. On the margins of swamps, middle and Southern Ga.

7. A. Floribunda. *Stem* glabrous. *Leaves* ovate-oblong, coriaceous, acute, slightly serrulate; racemes axillary, secund.

White. ♄ May—June. Mountains.

8. A. Ferruginea. A shrub with flexuous branches. *Leaves* obovate, entire, scaly beneath, coriaceous, on long petioles with revolute margins. *Flowers* axillary, clustered. *Corolla* globose, ferruginous on the outside. *Anthers* unawned.

White. ♄. June—July. Pine barrens. 3–5 feet.

9. A. Rigida. A small tree with rigid branches. *Leaves* lanceolate, on short petioles, crowded, tomentose underneath, margins revolute. *Flowers* in axillary clusters. *Corolla* globose, ferruginous.

Yellowish. ♄. June—July. Southern Geo. and Florida. 15–20 ft.

10. A. Ligustrina. A shrub with irregular branches, pubescent. *Leaves* obovate, lanceolate, acuminate, nearly entire, or finely serrulate. *Flowers* in terminal panicles; peduncles 3–6 at each bud, 1-flowered. *Corolla* nearly globose, pubescent.

White. ♄. May—June. Damp soils. 3–15 feet.

11. A. Frondosa. A small shrub, pubescent. *Leaves* obovate-lanceolate, nearly sessile, acute or acuminate, tomentose. *Flowers* on leafiy paniculate branches; pedicels axillary, 2–5 at each bud. *Corolla* globose. *Anthers* awned.

Whitish. ♄. May—June. Damp soils. 3–5 feet.

12. A. Arborea. A shrub or tree, much branched. *Leaves* lanceolate-oval, acuminate, finely serrate, or entire, glabrous, sour to the taste. *Flowers* in terminal racemose panicles. *Corolla* pubescent, ovate-oblong. *Anthers* unawned, linear. *Sorrel Tree.*

White. ♄. Middle and upper Geo. & Car. June—July. 15--20 feet.

13. A. Racemosa. A small shrub, with irregular branches. *Leaves* lanceolate, acute, serrulate, pubescent on the under surface. *Flowers* in terminal racemes. *Calyx* purple ciliate. *Corolla* oblong-ovate, furrowed. *Anthers* 4 awned.

White. ♄. March—May. Wet places. 3--5 feet.

14. A. Speciosa. A small branching glabrous shrub. *Leaves* oval, obtuse, crenate. *Flowers* in naked terminal racemes. *Corolla* campanulate. *Anthers* 4 awned.

White. ♄. May—June. Southern Car. & Geo. 3--4 feet.

15. A. Mariana. A small shrub, sparingly branched. *Leaves* broad-lanceolate, acute, entire, coriaceous, sour to the taste. *Flowers* in clusters near the summit of the old branches; peduncles 1-flowered. *Corolla* ovate; filaments hairy at the base.

White, tinged with red. ♄. May—Aug. Dry sandy soils.

Genus VII. CYRILLA.

Calyx minute, 5 parted. *Petals* 5, inserted into the calyx. *Stamens* 5. *Style* 1. *Stigmas* 2. *Fruit* a berry, 2-celled. *Seeds* solitary.

1. C. Racemiflora. A large shrub with verticillate branches, which spring from the summit of the wood of the preceding year. *Leaves* alternate, cuneate, lanceolate, coriaceous, alternate, growing only on the new wood; petioles slightly decurrent. *Flowers* in simple racemes, clustered at the summit of the branches of the preceding year. *Calyx* small. *Petals* scarcely united, inserted into the calyx. *Anthers* bifid at the base, 2-celled. *Style* short, thick. *Stigmas* 2, obtuse.

White. ♄. June—July. 10--15 feet.

Genus VIII. KALMIA.

Calyx 5 parted. *Corolla* salver form, with a border continuing at the base into 10 cornute protuberences, into the cavities of which the anthers are concealed. *Stamens* 10. *Style* 1. *Capsule* 5-celled.

1. K. Latifolia. A small shrub with irregular crooked branches. *Leaves* on long petioles, scattered, and by threes, oval, coriaceous, glabrous and green on both sides, perennial, shining. *Flowers* in large terminal corymbs, pubescent viscid. *Calico flower. Ivy bush.*

2. K. Angustifolia. A very small shrub, with creeping roots. *Leaves* scattered, or ternate, oblong, obtuse, slightly ferruginous underneath. *Flowers* in lateral corymbs: peduncles and calyx, glandular, pubescent.

Red. ♄. April—May. Sandy woods. 1--2 feet.

3. K. Cuneata. *Leaves* cuneate, oblong, pubescent underneath, scattered, slightly awned at the apex *Flowers* few, in lateral corymbs.

White with red near the base. ♄. June—July. Southern Car. 1--2 ft.

4. K. Hirsuta. A small shrub, with hairy branches. *Leaves* alternate, and opposite nearly sessile, lanceolate, acute, hairy. *Flowers* solitary, on axillary peduncles, longer than the leaves.

Red. ♄. May—Sept. In wet sandy pine barrens. 10--18 inches.

Remarks.—The Kalmias afford some of the most splendid ornaments of the forest. The leaves are all poisonous, nevertheless some animals, it is said, eat them with impunity, and that too, to such an extent, as to render their flesh poisonous to man, it becoming so impregnated with the poison of the leaves. This has proved the case with Partridges after a winter of deep snows on the mountains, when the bird is compelled to live almost entirely on these leaves. An ointment made from the leaves, has been used in cases of *Scald-head*, *Itch*, and other cutaneous affections. Care should be had in its use, lest the system should be injuriously affected by the cutaneous absorption of the poison.

Genus IX RHODODENDRON.

Calyx 5 parted. *Corolla* funnel shaped, with an unequal border. *Stamens* declined, 10. *Styles* 1. *Capsule* 5-celled.

1. R. Maximum. A large shrub. *Leaves* oblong, acute, the under surface lighter than the upper, coriaceous, thick, perennial, entire, ferruginous

on the under surface. *Flowers* in compact terminal racemes, covered when young with large ferruginous bracteas. *Corolla* large, irregular. *Stamens* declining, longer than the corolla. *Styles* as long as the stamens. The leaves of this species vary considerably in form, some being obtuse and the others acute at the base, the flowers also vary from purple, white, to rose color. *Mountain Laurel.*

ħ. Mountains. 4--20 feet.

2. R. PUNCTATUM. A small shrub, with straggling branches. *Leaves* oblong-lanceolate, ferruginous underneath with resinous dots, glabrous above. *Flowers* in compact terminal racemes. *Corolla* with oval or ovate segments, a little undulate.

Pale red. ħ June—July. 4–6 feet.

GENUS X. EPIGÆA.

Calyx 5-parted, with 3-bracts at the base, large. *Corolla* hypocrateriform, border 5-parted, spreading, tube villous within. *Stamens* 10. *Style* 1. *Capsule* 5-celled.

1. E. REPENS. A very small prostrate shrub, creeping. *Leaves* cordate, ovate, entire, reticulate, when young slightly fringed, hispid along the midrib. *Flowers* in axillary racemes; bracts as long as the calyx. *Corolla* sub-cylindrical. *Trailing Arbutus. Ground Laurel.*

White, tinged with red, fragrant. Jan.—March. Common in sandy soils.

GENUS XI. LEIOPHYLUM.

Calyx deeply 5-parted. *Petals* scarcely united. *Stamens* 10, exserted. *Capsule* 5-celled, opening at the summit.

1. L. BUXIFOLIUM. A very small shrub, branching, glabrous. *Leaves* small, oval, lanceolate, entire, glabrous, revolute at the margin. *Flowers* in small terminal corymbs, with persistent calyx. *Sand Myrtle. Sleek Leaf.*

White. ħ. Mountains. 6–8 inches.

GENUS 12. BEJARIA.

Calyx 7-cleft. *Corolla* 7-petaled. *Stamens* 14. *Style* 1. *Capsule* 7-celled, many seeded.

1. B. RACEMOSA. A handsome shrub, erect, branching, hispid and glutinous. *Leaves* ovate-lanceolate, alternate, perennial, entire, glaucous on the under surface. *Flowers* in long simple racemes. *Calyx* campanulate with very short segments. *Petals* obovate, as long as the stamens. *Style* persistent. *Capsule* globular.

White. ħ June—July. Southern Ga. 3–4 feet.

GENUS XIII. AZALEA.

Calyx small, 5-parted. *Corolla* campanulate, with somewhat unequal segments. *Stamens* 5-inserted on the receptacle. *Style* 1, straight. *Capsule* 5-celled, 5-valved, dehiscing at the summit.

1. CALENDULACEA. A small shrub. *Leaves* ovate, pubescent on both sides. *Flowers* in clusters, large, not viscid, teeth of the calyx oblong. *Corolla* with rather a short tube. Flowers vary in color from deep red variegated with yellow, to bright yellow, and rose colored, all of which are often found growing near each other.

ħ April—June. Abundant near Culloden. 2–6 ft.

2. A. Canescens. A small shrub. *Leaves* obovate, pubescent above, tomentose beneath. *Flowers* not viscid, rather naked; teeth of the calyx short, rounded

Rose color. ♄ April—May. Lower Car. and Ga. 3–4 feet.

3. A. Bicolor. A small shrub, with the young branches hairy, hispid. *Leaves* oblong, hairy on both sides. *Flowers* small, naked, not viscid. *Calyx* very short, with 1 long narrow segment. *Stamens* longer than the tube.

Nearly white, with red tube. ♄ May—June. Sandy hills Ca. & Ga. 2–3 ft.

4. A. Nudiflora. A small shrub producing many stems from the root. *Stem* branching towards the summit, young branches pubescent. *Leaves* pubescent, lanceolate oblong, the veins beneath bristly, alternate, crowded towards the summit, margins of under surface pubescent. *Flowers* in terminal racemes, tube of the corolla pubescent, viscid; segments of the border unequal, filaments longer than the corolla. *Capsule* hairy. A very variable plant, from which has arisen numerous varieties, but the preceding description we believe will include all the essential characteristics.

White, pale red, deep red, scarlet and yellow. ♄ March—May. Common.

5. A. Viscosa. A small shrub, with young hispid branches. *Leaves* lanceolate, oval, or obovate with scabrous margins; nerves of the leaves hispid. *Flowers* in terminal racemes. *Calyx* minute. *Corolla* hispid and viscid. *Stamens* hardly as long as the corolla. *Style* longer than the stamens.

White or red. ♄ May—July. Damp soils. 3–6 ft.

Order LX. VACCINEÆ.

Calyx adhering to the ovary, 4–5-toothed. *Corolla* urceolate, or sometimes campanulate, 4–5-cleft. *Stamens* 8–10, inserted into an epigynous disk. *Anthers* with 2 horns at the base, 2-celled. *Ovary* inferior, 4–5-celled, many seeded. *Style* simple. *Fruit* a berry, crowned by the limb of the calyx, succulent. *Shrubs* with alternate, coriaceous leaves.

Genus I. VACCINIUM.

Calyx superior, 4–5-cleft. *Fruit* globose, 4–5-celled, many seeded. *Stamens* 8–10.

(a.) Leaves deciduous, Corolla campanulate.

1. V. Stamineum. A shrub, erect, branching, young branches pubescent. *Leaves* oval, lanceolate, nearly acute, entire, glaucous beneath. *Flowers* solitary, axillary, nodding, on filiform peduncles, segments of the corolla oblong, acute. *Anthers* exserted, awned. *Berry* blue. *Whortle or Huckle berry.*

White. ♄. April—May. Dry soils. 2–3 feet.

2. V. Arboreum. A small tree, young branches long, straight, pubescent, old ones crooked. *Leaves* broad, lanceolate, serrulate, pubescent on the under surface, on short petioles, sometimes nearly round. *Flowers* in leafy racemes, nodding. *Calyx* small. *Corolla* 5-cleft, angled; segments reflected. *Stamens* very short. *Berry* globular, black, dry. *Farkle berry.*

White. ♄. April—May. Dry, fertile soils.

3. V. Dumosum. A small shrub, with the young branches sprinkled with resinous dots. *Leaves* cuneate, obovate, nearly sessile, finely serrulate, with revolute margins. *Flowers* in leafy racemes; pedicels solitary, axillary; peduncles and calyx roughened with glandular dots. *Corolla* angled, berries nearly black. *Bush-Wortleberry.*

White. ♄. June. Pine woods. 12–18 inches.

4. V. Frondosum. A branching shrub, with the young branches pubes-

cent. *Leaves* oval, lanceolate, entire, rugose, somewhat glaucous, slightly pubescent, sprinkled with glandular dots. *Flowers* 6–8, in racemes. *Corolla* contracted at the mouth, somewhat urceolate. *Fruit* large, blue.

White. ♄. April. In close soils. 3 feet.

5. V. Resinosum. A branching shrub. *Leaves* oblong, oval, entire, sprinkled with resinous dots on the under surface. *Flowers* in lateral racemes, secund. *Corolla* short, ovate. *Stamens* exserted. Berries large, black.

White. April—May. Mountains. *Black-Wortleberry.*

(*b.*) *Leaves perennial.*

6. V. Myrsinites. A small shrub, erect, branching, young branches pubescent. *Leaves* small, sessile, ovate, mucronate, serrulate, pubescent when young, dotted on the under surface. *Flowers* in axillary and terminal racemes; segments of the calyx acute, red. *Corolla* oblong, or nearly urceolate.

Pale purple. ♄. March—April. Pine barrens, very common. 1–2 ft.

7. V. Myrtifolium. A creeping shrub, glabrous. *Leaves* oval, petiolate, denticulate, shining. *Flowers* small, in sessile axillary clusters. *Corolla* campanulate 5-toothed. *Anthers* unawned. *Fruit* small, on pedicels, globose, black.

White. ♄. April—May. Carolina, Georgia.

(*c.*) *Corolla urceolate.*

8. V. Corymbosum. A shrub, with few geniculate, straggling branches. *Leaves* nearly sessile, long-lanceolate, acute, finely serrulate, pubescent when young. *Flowers* in crowded racemes near the summit of the stem, bracteate. *Corolla* oblong, slightly angled. *Stamens* short, with unawned anthers, filaments hairy. *Style* longer than the stamens. *Berries* black. *Bilberry.*

White, tinged with purple. ♄. March—April. In damp soils. Common. 4–8 feet.

Va. Amonenum. *Corolla* cylindric. *Calyx* reflexed. *Flowers* large, young branches reddish.

Va. Fuscatum. *Leaves* serrulate. *Flowers* in terminal, corymbose racemes, nodding. *Corolla* cylindric, striped with red. *Calyx* brown.

9. V. Virgatum. A shrub with the flower-bearing branches, nearly leafless. *Leaves* oblong-serrulate, glabrous on both surfaces. *Flowers* in sessile racemes, bracteate. *Calyx* with reflected segments *Corolla* contracted at the throat.

White, tinged with red. March—April. Damp soils. 2–3 feet.

10. V. Galezans. A small shrub, with pubescent, dotted branches, and creeping roots. *Leaves* sessile, lanceolate, cuneate, serrulate, pubescent, with the margins often tinged with purple. *Flowers* in sessile fasicles, axillary, with 3–4 bracts, at the base of each peduncle. *Corolla* long, nearly cylindrical, slightly angled; filaments hairy. *Anthers* uncrowned. *Fruit* small, black.

White, tinged with red. ♄. March—April. Damp soils. 1–2 feet.

11. V. Tenellum. A small shrub, with numerous green branches, branches angled. *Leaves* sessile, ovate-lanceolate, mucronate, serrulate, shining on both sides. *Flowers* in dense terminal fasicles. *Calyx* green. *Corolla* ovate. *Fruit* bluish-black, large.

Pale red. ♄. March—April. In dry soils. 1–2 feet.

12. V. Myrtiloides. A large shrub, with long slender numerous branches. *Leaves* small, sessile, lanceolate, crenulate, glabrous shining. *Flowers* usually solitary, axillary. *Fruit* black.

White. ♄. March—April. On the banks of rivers. Middle and Southern Geo. 6–8 feet.

Genus II. OXYCOCCUS.

Calyx 4-cleft. *Corolla* with 4 linear segments. *Stamens*

8; filaments connivent. *Anthers* tubular 2 parted. *Fruit* many seeded.

1. O. Erythrocarpus. A small shrub, with erect, flexuous branches. *Leaves* oval, membranaceous, acuminate, serrulate, and ciliate, hairy along the veins. *Flowers* axillary. *Calyx* minute, 4-cleft; segments acute. *Corolla* long, revolute. *Fruit* red, transparent.
Red. ♄. June. Mountains. 2–3 feet.

Order LXI. PRIMULACEÆ.

Calyx divided 4–5-cleft, inferior, regular, persistent. *Corolla* hypogynous, regular; limb 4 or 5-cleft. *Stamens* inserted upon the corolla, opposite to its segments. *Ovary* 1-celled. *Style* 1. *Stigma* capitate. *Capsule* with central placentæ. *Seeds* numerous, peltate; embryo straight, cylindrical. Herbaceous plants, with opposite, or whorled leaves.

Genus I. LYSIMACHIA.

Calyx 5 parted. *Corolla* rotate, 5-cleft. *Stamens* 5. *Stigma* 1. *Capsule* 10 valved, globose.

1. L. Hebbemonti. *Stem* erect, glabrous, columnar. *Leaves* usually by fours, ovate-lanceolate, entire, glabrous, dotted, sessile, 3–5 nerved, lateral ones obscure. *Flowers* in terminal racemes, the lower flowers opposite, or verticillate, the upper alternate; segments of the calyx linear-lanceolate; those of the corolla oblong-lanceolate, dotted; filaments 5, cohering at the base.
Yellow. ♃. June—July. A few miles east of Columbia S. C.

2. L. Quadrifolia. *Stem* erect, hairy. *Leaves* verticillate by fours, ovate, acute, nearly sessile. *Flowers* on axillary peduncles; peduncles 1-flowered, about half the length of the leaves; segments of the calyx lanceolate, pubescent, dotted. *Stamens* shorter than the corolla, cohering at the base.
Loose strife.
Yellow. ♃. May—July. Middle Car. & Geo. 1–2 feet.

3. L. Lanceolata. *Stem* erect, simple, smooth. *Leaves* verticillate by fours, on short petioles, lanceolate. *Flowers* on verticillate peduncles, the upper ones in racemes; peduncles many flowered; segments of the corolla, ovate, acute.
Yellow. ♃. June—July. Middle Car.

4. L. Ciliata. *Stem* erect, branching, quadrangular, furrowed, glabrous, dotted. *Leaves* generally by fours, verticillate, on rather short ciliate petioles, cordate-ovate, upper ones lanceolate. *Flowers* axillary, on 1-flowered peduncles, nodding; segments of the calyx acuminate, lanceolate; tube of the corolla, composed of a purple ring, sprinkled with yellow glands; segments toothed, slightly ciliate at the base. *Anthers* 2-lobed.
Yellow. ♃. June—July. In rich soils.

5. L. Quadriflora. *Stem* glabrous, branching, furrowed. *Leaves* opposite, sessile, long-linear, lanceolate, narrowed at the base, almost to a petiole. *Flowers* on peduncles, by fours, terminal; segments of the calyx long, lanceolate, acuminate; those of the corolla, slightly crenate.
Yellow. ♃. June—July. Southern Geo. 2–3 feet.

6. L. Heterophylla. *Stem* erect, branching, glabrous, angular. *Leaves* opposite, the lower ones nearly orbicular, becoming narrower towards the summit, the upper ones being linear, glabrous, ciliate at the base. *Flowers*

axillary nodding, on one flowered peduncles; segments of the calyx lanceolate, of the corolla, crenate.

Yellow. ♃. June—Aug. Middle country of Car. & Geo.

Genus II. CENTUNCULUS.

Calyx 4-cleft, persistent, with lanceolate segments. *Corolla* 4-cleft, persistent, with acute segments. *Stamens* 4 inserted into the corolla. *Capsule* globose, 1-celled.

1. C. Lanceolatus. *Stem* prostrate, creeping, with assurgent extremities, branched, glabrous. *Leaves* alternate, lanceolate, somewhat cuneate, slightly decurrent. *Flowers* solitary, axillary, sessile. *Calyx* persistent. *Corolla* a little longer than the calyx, attached to the capsule. *Anthers* 2-lobed.

Pimpernell.

Red. ☉. March. In pastures. 2–3 inches.

Genus III. HOTTONIA.

Calyx 5-parted. *Corolla* salver form, shorter than the calyx. *Stamens* 5, inserted on the tube of the corolla. *Capsule* globose.

1. H Inflata. *Stem* thick spongy, generally submersed. *Leaves* long, crowded, pectinate, submersed, with the segments linear, several scapes, rising from the summit of the stem, with inflated internodes. *Flowers* verticillate, pedunculate.

White. ♃ June—July. Middle Ga.

Genus IV. ANAGALLIS.

Calyx 5-parted, persistent, with acute, linear-lanceolate segments. *Corolla* 5-parted, with oblong segments, rotate. *Stamens* 5; filament 1. *Capsule* 1-celled.

1. A. Arvensis. *Stem* procumbent. *Leaves* opposite, entire, sessile, ovate-lanceolate. *Flowers* axillary, solitary, on peduncles longer than the leaves. *Calyx* persistent, with acute segments. *Corolla* with segments longer than the calyx, crenulate. *Stamens* shorter than the corolla. *Style* filiform. *Stigma* simple.

Red Chickweed.

Red. ☉ June—July. Low country. 6–12 in.

Genus. V. SAMOLUS.

Calyx 5-cleft, persistent. *Corolla* 5-lobed, salver form. *Stamens* 5, with 5 sterile filaments alternating with them. *Capsule* 1-celled, semi-inferior many seeded.

1. S. Valerandi. *Stem* generally simple, erect. *Leaves* obovate, entire, obtuse, tapering into a petiole. *Flowers* in terminal loose racemes, small.

Black weed.

White. ♃ June—Sept. In wet boggy places. 6–10 in.

Genus VI. MICRANTHEMUM.

Calyx 4-parted. *Corolla* 4-cleft, segments unequal. *Stamens* 2. *Capsule* 1-celled 2-valved, many seeded.

1. M. Orbiculatum. *Stem* prostrate, creeping, glabrous, terete. *Leaves*

opposite, sessile, orbicular, abruptly narrowed at the base, entire, obscurely 5-nerved. *Flowers* axillary, solitary, on short peduncles; segments of the calyx slightly spatulate, the two upper ones shorter. *Corolla* shorter than the calyx, the lower segments elongated. *Stamens* dilated at the base. *Anthers* globose, 2-lobed, white. *Style* filiform. *Capsule* globose, 2-celled, 2-valved, many seeded, with central placentæ. *Round leaved Micranthemum.*
White. 4 Through the Autumn. Very common. 3–6 in.

2. M. Emarginatum. *Stem* prostrate or floating, creeping. *Leaves* sessile, oval, and obovate entire, emarginate, obscurely 5-nerved. *Flowers* smaller than the preceding, on very short peduncles *Large leaved Micranthemum.*
White. 4 Through the summer. Common in wet places.

Order LXII. LENTIBULARIÆ.

Calyx divided, persistent, hypogynous. *Corolla* irregular, bilabiate, spurred. *Stamens* 2, included within the corolla. *Anthers* simple, 1-celled. *Ovary* 1-celled. *Style* 1, short. *Stigma* bi-lamellate. *Capsule* 1-celled, many seeded, with central placentæ. *Seeds* minute. Herbaceous plants, with radicle leaves; growing in swamps and marshes.

Genus I. PINGUICULA.

Calyx bi-labiate, 5-cleft. *Corolla* ringent, spurred at the base. *Stamens* 2, very short.

1. P. Elatior. *Stem* none. *Leaves* all radicle, spatulate ovate, entire, viscid, obtuse, scape columnar, villous at the base, several from each root. *Flowers* solitary. *Calyx* deeply 5-cleft, the 3 lower segments approximate; tube of the corolla ventricose, villous within, veined with purple, equally 5-cleft; segments 2-lobed; spur obtuse, compressed, half as long as the tube. *Anthers* globose, approximate, 1-celled. *Style* short. *Stigma* somewhat 3-lobed. *Capsule* 1-celled, terminated by the persistent style. *Tall Pinguicula.*
Yellow. 4 March—April. Common in wet places.

2. P. Lutea. *Stem* none; scapes 1–3 from each root, pubescent, 1-flowered. *Leaves* similar to the preceding. *Calyx* equally 5-cleft. *Corolla* campanulate, 5-cleft, with the segments 2-lobed, the inferior lamella of the stigma dilated, covering the anthers, the upper one minute; the whole plant pubescent, with the hairs terminated by a viscid gland. *Yellow Pinguicula.*
Yellow. 4 March—April. Pine barrens very common.

3. P. Pumila. *Scapes* several from each root, pubescent, hairs terminated by viscid globule. *Leaves* smoother than in the preceding species. *Calyx* pubescent, with obtuse segments. *Corolla* villous within; tube streaked with purple, yellowish. *Stigma* with the upper lamella slightly 3-lobed, short, the lower one ciliate, covering the anthers. *Capsule* globose, pubescent.
Pale blue. 4 March—April. Common in Southern and middle Ga.

Genus II. UTRICULARIA.

Calyx bilabiate, lips undivided, nearly equal. *Corolla* ringent, the lower lip spurred at the base. *Stamens* 2, with the filaments incurved, bearing the anthers within the apex. *Stigma* bi-lamellate. *Capsule* 1-celled.

1. U. Inflata. *Stem* submersed, branching, terete, glabrous. *Leaves* alternate, the lower ones whorled, inflated, pinnatifid at the extremities; seg-

ments setaceous. *Flowers* in racemes, surrounded by a six leaved involucre, floating on the surface of the water. *Calyx* persistent, segments nearly equal, concave, ovate. *Corolla* with the upper lip entire, broad-ovate, smaller than the under lip, lower lip 3-cleft, the lateral segments broad, and shorter than the middle segments. Spur bifid, the lower lamella of the stigma dilated, ciliate, reflexed.

Yellow. 4. Still waters. Very common.

2. U. Fibrosa. *Stem* sub-mersed, round. *Flowers* in simple racemes; peduncles 6--8 inches long, columnar; pedicels 1--2 inches long, slender, upper lip of the corolla large, slightly 3-lobed, lower lip smaller; spur subulate, emarginate.

Yellow. 4 September—October. 2--3 feet.

3. U. Saccata. *Stem* sub-mersed, glabrous, terete. *Leaves* alternate, 4--5 parted at the base, segments divided, with setaceous segments; peduncles axillary, 1--2, generally 1-flowered, upper lip of the corolla nearly round, shorter than the lower; the middle segment of the lower lip oval, with reflected margin; spur subulate, covered by the reflexed margins of the middle segment.

Purple. 4 June—July. Stagnant waters, common. 1--2 feet.

4. U. Longirostris. *Stem* floating. *Leaves* divided, with setaceous segments. *Flowers* on peduncles 2--3 inches long, 2-flowered, lips of the corolla obscurely 3-lobed, the lower one emarginate, ascending.

Yellow. 4 June. Stagnant water. Carolina, Georgia.

5. U. Gibba. *Stem* floating; peduncle 6--8 inches long, bearing several small flowers. *Corolla* with the lips obscurely lobed; spur shorter than the lower lip of the corolla, gibbous in the middle.

Yellow. 4 June. In ponds in the low country.

6. U. Bipartita. *Scape* 2--4 inches high, bearing generally several flowers. *Corolla* small; lips nearly entire, equal; spur obtuse, half the length of the corolla, lower segment of the calyx generally 2-cleft.

Yellow. 4 October. In muddy places.

7. U. Biflora. *Stem* sub-mersed, slender. *Leaves* verticillately divided with setaceous segments. *Flowers* on axillary peduncles; peduncles long, (3--4 inches,) generally 2-flowered; lips of the corolla entire, or the upper one obscurely 3-lobed, reflexed, shorter than the lower; spur subulate.

Yellow. 4. May—June. In stagnant water.

8. U. Personata. *Scape* 1--2 feet high, slender, glabrous, leafless. *Flowers* 4--10 rather large; upper lip emarginate; spur subulate, slightly curved.

Yellow. 4. July—Aug. In damp soils. Middle Car. & Ga.

9. U. Setacea. *Stem* erect, setaceous, nearly leafless, with a few ovate scales. *Flowers* on short, setaceous peduncles, 4--7, lower lip 3-lobed, upper lip ovate; spur subulate; the lower lamella of the stigma incised.

Yellow. 4. April—May. Wet soils, common.

Order LXIII. SAPOTEÆ.

Calyx 5-cleft, regular, persistent. *Corolla* 5-cleft, hypogynous, regular, deciduous. *Stamens* 5, inserted into the corolla. *Style* 1. *Ovary* several celled, with an erect ovule in each cell. *Fruit* baccate, by abortion only one seeded; embryo erect, large. Trees or shrubs. *Leaves* alternate, entire, coriaceous, without stipules.

Genus I. BUMELIA.

Calyx 5-cleft. *Corolla* 5-cleft, salver form. *Style* 1, paracorolla 5-leaved; drupe 1-seeded.

1. B. Lycioides. A small tree, with smooth branches, spiny. *Leaves* lanceolate, broad, smooth on both sides, on short petioles, clustered on the old alternate buds, alternate on the young branches; spines axillary. *Flowers* clustered, on 1-flowered peduncles; drupe black.

Greenish white. ½. May—June. Wet soils. Middle Carolina, near Columbia.

2. B. Retinata. A small shrub, with spreading branches, spiny. *Leaves* small, obovate, smooth. *Flowers* in clusters, (15–20,) on short pedicels.

Greenish white. ½. June—July. Banks of streams. Georgia.

3. B. Texax. A small tree, with slender, flexible branches. *Leaves* lanceolate, cuneate, pubescent underneath. *Fruit* oval. *Flowers* in clusters.

Greenish White. ½. June—July. In dry soils. 20–30 feet.

4. B. Lanuginosa. A small tree, with expanding pubescent branches. *Leaves* oblong lanceolate, covered with a ferruginous pubescence on the under surface, obtuse. *Drupes* globose.

White. ½ June—July. Dry, light soils. 8–12 feet.

Order LXIV. EBENACEÆ.

Flowers diœcious. *Calyx* 4-6 cleft, nearly equal, persistent. *Corolla* urceolate, hypogynous, regular, 4–6 cleft, in the sterile florets 8–16 stamens; filaments frequently double, each bearing an anther. *Anthers* 2-celled, with longitudinal dehiscence; in the fertile florets 4–5 stigmas. *Fruit* fleshy, nearly globular, 8–12 seeded; embryo straight; cotyledons foliaceous. Trees or shrubs, with alternate ex-stipulate leaves.

Genus I. DIOSPYROS.

Genus the same as the Order.

1. D. Virginiana. A tree or shrub, with irregular branches. *Leaves* alternate on short petioles, oval-lanceolate, acuminate, somewhat pubescent along the margin. *Flowers* axillary, solitary, on short peduncles. *Calyx* of the fertile flowers persistent. *Fruit* yellowish red, with several large seeds immersed in a soft pulp, eatable when perfectly ripe. *Persimmon.*

Greenish yellow. ½ May—June. Common. 6–40 feet.

Remarks.—The Persimmon is too well known to need my directing the attention of the student to its uses or properties. The bark is a powerful astringent, and is used in intermittent fevers. The fruit when perfectly ripe, and mixed with yeast and sugar, makes an agreeable and healthy drink, known as *Persimmon Beer.*

Order LXV. STYRACEÆ.

Calyx 4–5-cleft, persistent. *Corolla* 4–5-cleft, or as many petaled. *Stamens* 10, inserted into the tube of the corolla, of unequal length, slightly cohering. *Ovary* superior, 3–5-celled. *Style* simple. *Fruit* 1–8 celled; embryo imbedded in the albumen; cotyledons foliaceous. Shrubs with alternate exstipulate leaves. *Flowers* axillary.

Genus 1. STYRAX.

Calyx 4–5-toothed. *Corolla* 5-parted. *Stamens* 10, uni-

ted at the base, cohering to the tube of the corolla. *Drupe* coriaceous, dry.

1. S. Grandifolium. A middle sized shrub, with the young branches pubescent. *Leaves* large, broad ob-ovate acuminate, on short petioles, glabrous on the upper surface, hoary underneath. *Flowers* in simple axillary racemes, peduncles leafy near the base. *Calyx* tomentose. *Corolla* with expanding oblong segments. *Drupe* adhering to the calyx, many celled.
White. ♄ April—May. In rich soils, middle Car. & Ga. 6–12 ft.

2. S, Pulverulentum. A small shrub, growing in dense bunches. *Leaves* oblong, nearly sessile, acute, serrulate, a little hairy on the upper surface, tomentose beneath. *Flowers* on small lateral branches, axillary, terminal, fragrant.
White. ♄ March—April. In pine barrens. 10–18 in.

3 S. Læve. A small shrub with virgate and slightly geniculate branches. *Leaves* varying in size, lanceolate, acuminate, serrate, thick, glabrous. *Flowers* in lateral, leafy racemes. *Corolla* tomentose. *Fruit* globular, 1-celled.
White. ♄ April. On the margins of swamps. 4–6 ft.

4. S. Glabrum. A shrub with diffuse spreading branches. *Leaves* ovate-lanceolate, acute, finely serrulate, thin membranaceous, glabrous. *Flowers* in lateral, leafy racemes.
White. ♄ April. Margins of rivers. Middle Ga. 6–8 ft.

Genus II. HALESIA.

Calyx 4-toothed, attached to the ovary. *Corolla* 4-cleft, or 4-petaled. *Stamens* 8–12. *Fruit* 4-angled, 2-seeded.

1. H. Tetraptera. A small tree. *Leaves* ovate-lanceolate, pubescent, acuminate, serrulate, on short petioles, generally glaucous beneath. *Flowers* in small axillary clusters. *Corolla* campanulate, 4-cleft. *Stamens* 10–12, hairy at the base. *Fruit* 4-winged, oblong.
White. March—April. Very common. 10–20 ft.

2. H. Diptera. A small tree. *Leaves* ovate, and broad-lanceolate, acuminate, serrulate. *Flowers* in axillary clusters, 4-petalled. *Stamens* 8. *Fruit* compressed ob-ovate, with 2 large wings.
White. ♄ March—April. Common.

Order LXVI. ILICINEÆ.

Flowers dicœcious. *Calyx* 4–8 cleft. *Corolla* 4–8 parted, hypogynous, æstivation imbricate. *Stamens* 4–8; filaments erect. *Anthers* adnate. *Ovary* 2–6 celled. *Ovules* solitary. *Fruit* fleshy, 2–6 seeded, albumen fleshy large; embryo 2-lobed. Trees and shrubs with coriaceous leaves. *Flowers* small and axillary.

Genus I. ILEX.

Flowers dicœcious. *Calyx* 4-toothed. *Corolla* rotate, 4-cleft, in the sterile flowers stamens 4, alternate with the segments of the corolla, and inserted into it; in the fertile florets stigmas 4. *Style* none. *Fruit* 4-seeded.

1. I. Opaca. A large tree, with dense, irregular branches. *Leaves* alternate, oval-lanceolate, acute, spiny, dentate, glabrous, coriaceous, shining on the upper surface, perennial. *Flowers* clustered, on short peduncles. *Calyx* with 4 minute teeth. *Corolla* small, rotate, 4-cleft. *Fruit* scarlet, 4-seeded. *Holly.*

White. April—May. Dry, rich soils. 30–40 feet.

2. I. Dahoon. A small shrub, with long, virgate branches. *Leaves* alternate, oblong-lanceolate, coriaceous, glabrous, spiny when young, often entire when old. *Flowers* in axillary, paniculate clusters. *Corolla* small. *Berry* red, persistent. *Dahoon Holly.*

White. ½. May. Common. 4–12 feet.

3. I. Ligustrina. A shrub with expanding branches. *Leaves* narrow, lanceolate, cuneate, usually entire, coriaceous, perennial. *Flowers* generally solitary. *Fruit* red, scattered.

White. ½. May—June. Swamps. 6–10 feet.

4. I. Myrtifolia. A shrub, with expanding, rigid branches, pubescent when young. *Leaves* alternate, perennial, linear-lanceolate, glabrous, occasionally with a few sharp serratures. Sterile flowers generally by threes, fertile ones solitary, axillary.

White. ½. May—June. Around ponds. 10–20 feet.

5. I. Cassina. A shrub with erect, virgate branches, branchlets expanding, pubescent when young. *Leaves* alternate, oval, obtuse, serrate, glabrous, shining. *Flowers* in axillary clusters; peduncles generally 3-flowered, pubescent. *Corolla* with obtuse segments. *Fruit* globose, 4-celled, scarlet.

White. ½. March—April. Loose soils, near the ocean. 6–15 feet.

6. I. Prinoides. A small shrub, with virgate branches. *Leaves* lanceolate, cuneate; peduncles several flowered, one of them abortive, the others fertile.

White. ½. April—May. Near Culloden, Georgia.

Genus II. PRINOS.

Calyx 4–8-cleft. *Corolla* 4–8-parted. *Stamens* 4–8. *Flowers* dioecious, with the rudiment of a pistil, fertile florets. *Style* none. *Stigma* 4–8-cleft. *Fruit* baccate, 4–8 seeded.

1. P. Ambiguus. A small shrub, branches terete, somewhat virgate.—*Leaves* deciduous, ovate-lanceolate, acuminate at each end, slightly serrulate, pubescent underneath, on short petioles. *Flowers* with the sterile ones clustered, axillary, fertile ones generally solitary, or 3–4 in each axil; segments of the calyx sometimes 5, and of the corolla the same number. *Stigma* 4-5 furrowed. *Fruit* red, with 4–5 seeds.

White. ½. April—May. Southern Georgia. 3–4 feet.

2. P. Verticillatus. A large shrub or small tree. *Leaves* deciduous, on short petioles, oval, acuminate, finely serrate, pubescent underneath. *Flowers* with the fertile ones clustered, axillary, umbellate. *Stamens* 6. *Calyx* and *corolla* 6-cleft. *Fruit* red. *Black Alder.*

White. ½. April—May. Fertile soils. 10–20 feet.

3. P. Integrifolia. A small tree. *Leaves* deciduous, oval, entire, on short petioles, mucronate, glabrous, fertile flowers solitary, on long peduncles.

White. ½.

4. P. Lanceolatus. A shrub. *Leaves* deciduous, lanceolate, serrulate, glabrous, acute; fertile florets scattered, generally in pairs. *Calyx* & *Corolla* 5-cleft; sterile florets clustered. *Stamens* 3.

White. ½. June. Middle Carolina, Georgia. 6–8 feet.

5. P. Glaber. A small shrub, with many expanding branches. *Leaves* perennial, lanceolate, cuneate, alternate, glabrous, shining, somewhat serrate

towards the apex: fertile flowers, solitary, axillary; sterile ones clustered. *Stamens* 6. *Corolla* rotate. *Calyx* and corolla 6–8 parted. *Stigma* 3-lobed. *Fruit* black, 6–8-seeded.

White. ♄. April—May. Damp soils.

6. P. Coriaceus. A small shrub, with virgate branches. *Leaves* perennial, eliptical, acute, serrate near the summit, shining on the upper surface, dotted beneath, coriaceous; fertile flowers solitary, sterile ones clustered. *Calyx* and *Corolla* generally 8 parted. *Stamens* 8. *Fruit* 6–8-seeded.

White. ♄. May. On the margins of swamps. 5–6 feet.

Order LXVII. CONVOLVULACEÆ.

Calyx 5-parted, persistent. *Corolla* hypogynous, regular, 5-lobed, deciduous, plaited. *Stamens* 5, inserted into the base of the corolla, alternate with its segments. *Ovary* 2--4-celled, occasionally 1-celled. *Ovules* few, erect. *Style* 1, usually bifid, sometimes separated to the base. *Capsule* 1--4-celled. *Seeds* borne at the base of the placentæ. Herbs or shrubs usually twining. *Leaves* alternate, exstipulate.

Genus I. CONVOLVULUS.

Calyx 5 parted, sometimes bracteolate. *Corolla* funnel form or campanulate, plaited, with 5 segments. *Stamens* 5 shorter than the limb. *Ovary* 2–3-celled, few seeded. *Stigmas* 2. *Style* undivided.

1. C. Tenellus. *Stem* prostrate, branching at the base, hairy. *Leaves* on short petioles, eliptic, mucronate, slightly cordate, entire, somewhat hairy; peduncles axillary, bearing several flowers, longer than the leaves, bracts 2 at the summit of the peduncle. *Calyx* 5 leaved; acuminate, ciliate. *Corolla* small, externally hairy, with the margin obscurely 10 toothed; filaments 5, villous. *Anthers* sagittate. *Style* deeply cleft. *Capsule* hairy, 4-celled.

White. ♃. June—Aug. Common.

2. C. Aquaticus. *Stem* tomentose. *Leaves* oblong-ovate, on short petioles; peduncles generally 3-flowered, some times as long as the leaves. *Corolla* hairy. *Capsule* tomentose.

Rose color. ♃. Through the summer. Middle and lower Geo.

3. C. Spithamæus. *Stem* erect, branching, pubescent. *Leaves* cordate, or oval, pubescent. *Flowers* solitary, on axillary peduncles; bracts longer than the calyx.

White. ♃. June—July. In dry soils.

4. C. Obtusilobus. *Stem* prostrate, glabrous, branching. *Leaves* alternate, sinuate lobed, nearly hastate, emarginate. *Flowers* on peduncles with 2 small leaves near the middle. *Corolla* large, with a yellow tube and white limb. *Style* 2-cleft.

♃. Aug.—Oct. On the coast.

5. C. Purpureus. *Stem* twining, hairy. *Leaves* cordate, entire, peduncles 1–3-flowered. *Calyx* hairy. *Corolla* funnel-shaped. *Morning Glory.*

Blue, purple or white. ☉. Through the summer. Introdueed.

6. C. Machrorhizus. *Root* very large, white, farinaceous, insipid. *Stem* twining pubescent, somewhat angled. *Leaves* cordate, entire or lobed, pubescent underneath, the young leaves tomentose, acute; peduncles 1–5-flowered. *Calyx* pubescent. *Corolla* with the limb obscurely 10-lobed, pubescent on the outer surface. *Stamens* unequal. *Style* 2-cleft. *Capsule* 2–3-celled. *Seeds* hairy.

White tinged with purple. ♃. June—Oct. Is. of Car. & Geo.

7. C. Panduratus. *Root* large. *Stem* terete, nearly glabrous, young branches pubescent. *Leaves* cordate, entire or 3 lobed mucronate pubescent; peduncles 1-5-flowered, stipulate. *Corolla* with the limb slightly lobed. *Style* simple. *Wild Potatoe Vine.*

White and purple. ♃. May—Aug. In dry soils.

8. C. Sagittifolius. *Stem* twining, terete, glabrous. *Leaves* glabrous sagittate with long, acute, diverging auricles. Peduncles, axillary 1-flowered, solitary, bracteate. *Style* 2-cleft. *Capsule* 2-celled.

Purple. ♃. Through the summer. On the coast.

9. C. Repens. *Stem* twining, pubescent. *Leaves* sagittate with obtuse or truncate auricles, entire, pubescent, on long petioles. Peduncles axillary, solitary, 1-flowered, thickened towards the summit, pubescent. *Calyx* bracteate. *Corolla* with a long tube, the limb obscurely 4-lobed. *Style* slightly 2-cleft. *Capsule* 3-celled.

White, tinged with red. ♃. April—May. On the coast.

10. C. Tamnifolius. *Stem* twining, terete, hairy. *Leaves* cordate, slightly undulate, acuminate, entire with hairy margins, veins on the under surface muricate. *Flowers* in capitate clusters. Common peduncle, muricate, hairy. *Calyx* villous. *Corolla* small, 5-toothed. *Style* slightly 2-cleft. *Capsule* 2-celled.

Blue. ☉. Aug.—Sept. Middle Georgia.

Genus II. IPOMŒA.

Resembling the preceding genus. *Stigma* capitate globose. *Capsule* 3-celled.

1. I. Orbiculatis. *Stem* prostrate. *Leaves* orbicular, emarginate, coriaceous, on rather long petioles; peduncles usually 3-flowered, partial peduncles, bracteate. *Sepals* ovate, slightly mucronate. *Corolla* with a short tube.

Purple. ♃. Through the summer. On the coast.

2. I. Bona Nox. *Stem* prostrate, roughened, sometimes prickly. *Leaves* cordate, entire, or angled; peduncles 1-3-flowered. *Calyx* awned. *Corolla* undivided, with a long tube, large, white. *Elliott.*

3. I. Coccinea. *Stem* twining. *Leaves* alternate, cordate, acuminate, angled at the base; peduncles 3-5-flowered. *Sepals* awned. *Corolla* salver form, limb plaited.

Red. ☉. June—Sept. Common.

4. I. Trichocarpa. *Stem* twining, hairy, angled. *Leaves* cordate when young, 3-lobed when old; villous, margins frequently purple; peduncles 1-3-flowered, with 2 bracts at each division. *Sepals* oblong ciliate. *Corolla* pubescent on the inside near the base. *Stigma* globose. *Capsule* 4-celled, hairy.

Purple, or red. ☉ July—Oct. In cultivated lands, common.

5. I. Nil. *Stem* twining hairy. *Leaves* cordate, the old ones 3-lobed, acuminate; peduncles 1-3-flowered; segments of the calyx subulate, long, villous. *Corolla* with the limb obscurely 5-angled. *Stigma* globose.

White and Blue. ☉ In cultivated lands common. August—Oct.

6. I. Dissecta. *Stem* hairy. *Leaves* 7-lobed, glabrous, on pubescent petioles; segments sinuate; peduncles 1-flowered; segments of the calyx oval. *Corolla* campanulate.

☉ July. Calcareous soils, Georgia and Florida. Elliott.

Genus III. CUSCUTA.

Calyx 4-cleft. *Corolla* globose urceolate; limb 4–5 cleft. *Stamens* 5, inserted into the corolla. *Stigmas* 2. *Capsule* 2-celled, 2 seeds in each cell, dehiscence transverse.

1. C. AMERICANA. *Stem* twining, filiform, resembling orange-colored threads, springing first from the earth, afterwards becoming parasitic; the root dying. *Leaves* none. *Flowers* in racemose clusters. *Love Vine.*
White. ☉ Through the Summer. Common.

GENUS IV. DICHONDRA.

Calyx 5-parted, segments spatulate. *Corolla* 5-parted, bell-form, short. *Stamens* 5. *Stigmas* 2. *Capsule* 2-celled, formed of 2 carpels, each 1-seeded. *Seeds* globose.

1. D. CAROLINAENSIS. *Stem* creeping, pubescent. *Leaves* somewhat reniform, emarginate. *Calyx* ciliate, villous.
Purple. ♃ June. Louisiana.

ORDER LXVIII. POLEMONIACEÆ.

Calyx 5-parted, persistent, sometimes irregular. *Corolla* regular, 5-lobed. *Stamens* 5, inserted into the middle of the tube of the corolla, and alternate with its segments. *Ovary* superior, 3-celled. *Style* simple. *Stigma* trifid. *Capsule* 3-celled, dehiscence loculicidal. *Seeds* angular or oval, ascending; embryo straight; cotyledons foliaceous. Herbaceous plants.

GENUS I. PHLOX.

Calyx prismatic, deeply 5-cleft. *Corolla* salver form, with a flat 5-lobed border, lobes cuneate. *Stamens* unequal, inserted into the tube of the corolla. *Capsule* ovate, 3-celled, 1 seed in each cell.

1. P. ACUMINATA. *Stem* erect, little scabrous towards the summit, smooth towards the base. *Leaves* membranaceous, scabrous, lower ones spatulate-ovate, acuminate, upper ones lanceolate. *Flowers* in terminal corymbs; segments of the calyx subulate, awned; segments of the corolla rounded.
Purple. ♃ August—Sept. Common in the upper country. 3–5 ft.

2. P. PANICULATA. *Stem* smooth, erect. *Leaves* opposite, lanceolate, flat with scabrous margins, acuminate. *Flowers* in numerous opposite corymbs; segments of the calyx pubescent, awned. *Anthers* linear, 2-celled. *Stigma* hispid.
Purple. ♃ June—July. Upper districts Car. 2 ft.

3. P. UNDULATA. *Stem* erect glabrous. *Leaves* oblong-lanceolate, undulate, with scabrous margins. *Flowers* in paniculate corymbs; segments of the calyx awned, those of the corolla retuse.
Blue. ♃ July—Aug. Mountains. 2–3 ft.

4. P. PYRAMIDALIS. *Stem* erect, scabrous. *Leaves* cordate-ovate, acute. *Flowers* in pyramidal, fastigeate panicles; segments of the calyx lanceolate, acute, those of the corolla cuneate, truncate.
Purple. ♃ June—Aug. Mountains.

5. P. CORDATA. *Stem* erect, glabrous. *Leaves* cordate tapering towards the summit, auricled at the base, with scabrous margins. *Flowers* in somewhat paniculate corymbs, numerous, segments of the calyx awned, as long as the tube.
Blue. ♃ August. Upper districts Car. 1–2 ft.

6. P. Maculata. *Stem* erect, terete, dotted, sprinkled with glandular hairs. *Leaves* sessile, ovate-lanceolate, acute, with scabrous margins. *Flowers* in alternate corymbs. *Calyx* with subulate segments, angled. *Corolla* with obovate rounded segments.

Purple. 4 May—July. Rich soils. Common. 2–3 feet.

7. P. Carolina. *Stem* erect, pubescent. *Leaves* ovate-lanceolate, acute, glabrous. *Flowers* in fastigeate corymbs. *Calyx* glabrous, with linear-lanceolate teeth; segments of the corolla rounded.

Purple. 4. July—Sept. Upper districts of Carolina.

8. P. Nitida. *Stem* erect, glabrous. *Leaves* ovate-lanceolate, somewhat coriaceous. *Flowers* in fastigeate corymbs; segments of the calyx linear-lanceolate, acuminate, those of the corolla obovate.

Purple. 4. May—June. Middle Carolina, Georgia.

9. P. Glaberrima. *Stem* erect, glabrous. *Leaves* linear-lanceolate, or oval-lanceolate, glabrous, long, smooth. *Flowers* in terminal corymbs; segments of the calyx acute, linear-lanceolate, of the corolla, nearly round.

Blue. 4 May—June. Low country. 1-2 feet.

10. P. Aristata. *Stem* erect, slender, pubescent. *Leaves* linear. *Flowers* few, corymbose: segments of the calyx awned; tube of the corolla curved; segments obovate.

Purple. 4. May—June. Upper Districts of Carolina.

11. P. Pilosa. *Stem* erect, villous, purple, covered with a white pubescence. *Leaves* linear-lanceolate, or ovate lanceolate, pubescent, sessile, with revolute margins. *Flowers* in fastigeate corymbs, bracteate; segments of the calyx hairy, acute, subulate, those of the corolla obovate or acute.

Purple. 4. March—April. Rich soils. 12–18 inches.

12. P. Arena. *Stem* decumbent, assurgent, hirsute. *Leaves* ovate-lanceolate. *Flowers* numerous, in corymbs; segments of the calyx subulate, those of the corolla obtuse.

Purple. 4. May—June. Southern Georgia.

13. P. Divaricata. *Stem* erect, smooth, with divaricate branches. *Leaves* remote, ovate, membranous, sessile, upper ones alternate. *Flowers* in corymbs, scattered; segments of the calyx subulate.

Purple. 4. April. Swamps. 1–2 feet.

14. P. Setulata. *Stem* procumbent, assurgent, branching, hirsute. *Leaves* subulate, mucronate, ciliate, pubescent, the lower opposite, the upper alternate. *Flowers* axillary, somewhat corymbose. *Calyx* hairy, with acute linear segments; segments of the corolla cuneate, emarginate.

Rose color. 4 Feb.—May. In light soils, middle and upper districts of Carolina and Georgia.

15. P. Setacea. *Stem* procumbent, assurgent, hairy. *Leaves* subulate ciliate, somewhat fasciculate, pubescent. *Flowers* somewhat umbelled, or solitary, forming terminal corymbs: teeth of the calyx subulate; segments of the corolla cuneate, emarginate.

Purple. 4. April—May. Middle Carolina and Georgia.

Genus II. POLEMONIUM.

Calyx campanulate, 5-cleft. *Corolla* rotate, 5-parted; segments erect. *Stamens* 5, inserted on 5 teeth or valves, which close the orifice of the corolla. *Stigma* 3-cleft. *Capsule* 3-celled.

1. P. Reptans. *Stem* erect, glabrous, branching. *Leaves* pinnate, from 7-11 leaflets; leaflets lanceolate, acute, glabrous, entire. *Flowers* terminal, nodding. *Calyx* 5-cleft. *Jacob's Ladder.*

Blue. 4. Mountains. 10–12 inches.

Genus III. CANTUA. (*Syn. Ipomopsis.*)

Calyx 3–5-cleft. *Corolla* funnel form. *Stigma* 3-cleft, spotted. *Stamens* 5. *Capsule* 3-celled, many seeded. *Seeds* angled.

1. C. Coronopifolia. *Stem* pubescent. *Leaves* pinnatifid, sessile, fasciculate, with smooth, linear segments. *Flowers* in long racemose panicles. *Calyx* pubescent; segments subulate. *Corolla* dotted with red. *Stamens* inserted into the tube of the corolla. *Capsule* oblong, 3 furrowed.

Standing Cypress.

Red and Yellow. ♂. July. On the Congaree, near Columbia.

Remarks. One of the most beautiful of our native plants which has become extensively introduced into our gardens. We have never found it in any other locality than the one above noticed.

Genus IV. COLLOMIA.

Calyx 5-cleft, somewhat campanulate, large. *Corolla* funnel form, 5-lobed, lobes oval, oblong; tube straight, long, slender. *Capsule* 3-celled, triangular. *Seeds* oblong, angular, covered with a mucilage containing the *fibro-cellular tissue.*

1. C. Linearis. *Stem* pubescent. *Leaves* oblong-linear, somewhat lanceolate, floral ones ovate-lanceolate, acute. *Calyx* viscid.

Whitish purple. ☉. June. Louisiana.

Order LXIX. HYDROLEACEÆ.

Calyx 5-parted, persistent, æstivation, imbricate. *Corolla* regular, hypogynous. *Stamens* 5, inserted into the corolla. *Anthers* lobed at the base. *Ovary* 2--3-celled, surrounded by an annular disk. *Style* 2--3. *Fruit* capsular, 2--3-celled, dehiscence loculicidal. *Seeds* indefinite, small. Herbaceous plants, with alternate, entire, or lobed leaves. *Flowers* axillary and terminal.

Genus I. HYDROLEA.

Calyx 5-parted, or 5-leaved. *Corolla* campanulate, with the limb 5-parted, filaments inserted into the tube of the corolla, dilated at the base. *Capsule* 2-celled. *Seeds* numerous.

1. H. Quadrivalvis. *Stem* decumbent, assurgent, hairy, geniculate, spiny. *Leaves* cuneate lanceolate, alternate, entire, hairy along the veins. *Flowers* in axillary clusters, nearly sessile. *Calyx* 5-parted, hairy, with subulate segments. *Corolla* pubescent, with acute segments. *Capsule* globose. *Seeds* numerous, oval.

Blue. ♃ July—Sept. Around ponds. 1-2 ft.

2. H. Corymbosa. *Stem* erect, or assurgent towards the summit, without spines. *Leaves* lanceolate, sessile, with the veins and margins pubescent. *Flowers* solitary on the extremities of the small branches, somewhat corymbose. *Calyx* with the segments acute hairy. *Corolla* campanulate, with ovate segments, with yellowish veins, and white spots near the base. *Capsule* globose, glabrous.

Blue. ♃. Through the summer. In pine barren ponds. 1-2 feet.

Genus II. DIAPENSIA.

Calyx 5-parted, bracteate, fringed. *Corolla* salver form, with a short tube. *Stem* creeping with short assurgent branches.

1. D. Lapponica. *Leaves* lanceolate, cuneate, acute, pubescent at the base, upper ones crowded. *Flowers* at the extremities of the branches solitary. *Anthers* beaked.
White. 4. June—Aug. Mountains.

Order LXX. LOBELIACEÆ.

Calyx 4–5-cleft. *Corolla* irregular, inserted into the calyx, 5-cleft. *Stamens* 5, inserted into the calyx, alternate with the lobes of the corolla. *Anthers* cohering. *Ovary* 2–3-celled. *Ovules* numerous. *Styles* simple. *Stigma* surrounded by a cup-like fringe. *Capsule* 2–3-celled, many seeded, dehiscing at the apex. Herbaceous plants, with alternate leaves.

Genus I. LOBELIA.

Calyx 4–5-cleft. *Corolla* irregular, cleft on the upper side nearly to the base. *Stamens* united into a tube. *Stigma* 2-lobed. *Capsule* sometimes attached to the calyx. *Seeds* minute, scabrous.

1. L. Kalmii. *Stem* erect, slender, radical leaves, spatulate, ovate or nearly orbicular, pubescent; cauline leaves, linear, nearly, subulate. *Flowers* in terminal racemes, small, scattered, on short peduncles. *Calyx* 4-cleft, with subulate segments. *Corolla* with a 3-cleft border; the lateral segments subulate, reflexed, the middle segment 3-cleft. *Anthers* cohering into a tube, villous at the summit. *Stigma* villous. *Capsule* 2-valved, 2-celled, surrounded by the calyx.
Blue. 4. May—Aug. Damp soils. Common.

2. L. Paludosa. *Stem* slender, glabrous, slightly angled. *Leaves* lanceolate, cuneate, denticulate, the upper ones small, the lower ones 2 inches long. *Flowers* in racemes, remote. *Calyx* small. *Anthers* exserted.
Blue. 4. Through the summer. Damp soils.

3. L. Claytoniana. *Stem* erect, pubescent. *Leaves* sessile, oblong, serrulate, radical ones entire. *Flowers* in crowded spikes. *Stamens* longer than the tube of the corolla.
Blue. 4. July—Sept. Near Columbia.

4. L. Glandulosa. *Stem* erect, glabrous, leafy near the base. *Leaves* linear-lanceolate, sessile, somewhat amplexicaule and ciliate at the base. *Flowers* in racemes; pedicels bracteate. *Calyx* hairy, segments dentate, margin of the corolla hairy.
Blue. 4. Sept.–Oct. Damp pine barrens. Common.

5. L. Inflata. *Stem* erect, branching, hirsute. *Leaves* oval-lanceolate, sessile, serrate. *Flowers* in paniculate racemes. *Calyx* inflated, glabrous. *Corolla* small. *Stamens* about as long as the tube of the corolla.
Pale blue. 4. July—Sept. Upper country of Car. & Geo.

The seeds of this species, are used in large quantities, in the *Botanico Medical* practice as an emetic.

6. L. Syphilitica. *Stem* erect, hirsute, angled, nearly glabrous near the

base. *Leaves* oval lanceolate, sessile, large, crenulate, lower ones nearly glabrous. *Flowers* in leafy racemes. *Calyx* hispid, with reflexed margins. *Corolla* large.

Blue. ♃. July—Sept. Mountains. 2–3 feet.

7. L. Puberula. *Stem* erect, slightly angled, silky, pubescent. *Leaves* sessile, the lower ones obovate, obtuse, serrulate, the upper ones lanceolate, finely serrulate, with a silky luster. *Flowers* in racemes on short pedicels, all turning to one side; segments of the calyx villous, lanceolate, ciliate.

Blue. ♃. Sept.—Oct. Wet soils. Common. 2–3 feet.

8. L. Amœna. *Stem* erect, simple, pubescent, angled near the summit. *Leaves* broad-lanceolate, sessile, decurrent, sometimes incised, pubescent. *Flowers* in leafy racemes, secund. *Calyx* with subulate segments. *Anthers* blue. *Stigma* compressed.

Bright blue. ♃. Sept.—Oct. In wet places. Common. 2–4 feet.

9. L. Cardinalis. *Stem* erect, terete, simple, pubescent towards the summit. *Leaves* broad-lanceolate, serrate, cuneate, sprinkled with hairs. *Flowers* in terminal secund racemes; segments of the calyx, subulate; filaments red. *Anthers* blue. *Cardinal flower.*

A bright scarlet flower. ♃. Sept. Damp rich soils. 2–3 feet.

Remarks.—The *L. Inflata* and *Syphilitica* are possessed of powerful medical properties; the former of which has long been esteemed by the profession as a remedial agent in Asthma and other pectoral affections. It is now considered by a class of Practitioners known by the usual appellation of Thomsonians, as of prime importance in the cure of almost all diseases. Its being of universal application, we believe they found on the hypothesis of its possessing alterative powers in a high degree. Of the truth of these assertions we are entirely unable to judge.

Order LXXI. CAMPANULACEÆ.

Calyx superior, 5-parted, persistent. *Corolla* inserted into the top of the calyx, with a 5-cleft border, marcescent, regular, æstivation valvate. *Stamens* 5, inserted into the calyx. *Anthers* 2-celled. *Ovary* 2-celled, with many ovules. *Style* simple, hairy. *Fruit* dry, crowned by the persistent calyx and corolla, dehiscing by pores. *Seeds* numerous, attached to a central placentæ. Herbaceous plants.

Genus I CAMPANULA.

Calyx 5-cleft. *Corolla* campanulate, closed with valves, bearing the stamens. *Stigma* 3-cleft. *Capsule* inferior, 3-celled, dehising by lateral pores.

1. C. Amplexicaulis. *Stem* generally simple, erect, pentangular, with the angles retrorsely aculeate. *Leaves* cordate, sessile, pubescent, persistent, 5-parted, with lanceolate segments. *Corolla* with 5 acute segments. *Anthers* purple. *Style* pubescent towards the summit. *Capsule* oblong, angled.

Purple. ☉. April. Very common. 6–12 inches.

2. C. Acuminata. *Stem* erect, terete, glabrous. *Leaves* lanceolate, remotely serrate, cuneate, glabrous. *Flowers* generally 3 in the axil of each leaf.

Blue. ♃. July—August. Mountins

3. C. Divartcata. *Stem* erect, glabrous. *Leaves* sessile, lanceolate, with a long, tapering summit, a cluster of small leaves in each axil. *Flowers* small, solitary, in terminal panicles, with subulate leaves at each division.

September. Mountains. 2 feet.

4. C. Erinoides. *Stem* decumbent, diffuse, flexuous, angled by the decurrent leaves. *Leaves* lanceolate, serrate, decurrent with margins, and midrib retrorsely aculente. *Flowers* in panicles, small, solitary, terminal, nodding.
August. Mountains.

Order LXXII. CINCHONACEÆ.

Calyx superior, simple, divided or entire, bracteate. *Corolla* superior, tubular, with the number of divisions equal to those of the calyx. *Stamens* 4–5, inserted into the corolla, and alternate with the segments. *Ovary* inferior surmounted by a disk, 2 or several celled. *Ovules* numerous, placentæ central. *Style* 1. *Stigma* simple. *Fruit* dry or succulent. *Seeds* few or numerous. *Leaves* simple, entire, stipulate.

Genus I. SPERMACOCE.

Calyx 4-leaved. *Corolla* funnel shaped with a 4-parted limb. *Capsules* 2-celled with 2 seeds in each cell.

1. S. Tenuior. *Stem* erect, glabrous. *Leaves* lanceolate, scabrous on the upper surface. *Flowers* verticillate. *Stamens* included. *Seeds* hirsute.

2. S. Diodina. *Stem* procumbent, terete, sometimes branching, hirsute. *Leaves* linear-lanceolate, sessile, finely serrulate, hairy, a membranaceous stipule embracing the base of the leaves, with setaceous segments. *Flowers* axillary, sessile, clustered or solitary. *Calyx* 4 leaved. *Corolla* hairy, with a 3 parted limb. *Carpels* 2, connate, crowned with the calyx, each 1-seeded.
White. ☺. July—Sept. Poor soils. Common.

3. S. Involucrata. *Stem* hirsute. *Leaves* ovate lanceolate, acuminate, somewhat oblique; stipules with many setaceous segments. *Flowers* in terminal heads, surrounded with an involucre; tube long.
White. ☺. June—July. Carolina.

Genus II. DIODIA.

Calyx 2-leaved. *Corolla* funnel-shaped. *Capsule* 2-celled, 1 seed in each cell.

1. D. Virginica. *Stem* glabrous, procumbent, slender, nearly terete purple, narrow-lanceolate. *Corolla* glabrous. *Fruit* oblong glabrous.
White. ♃. May—August. Near Columbia.

2. D. Tetragona. *Stem* procumbent, creeping, slightly angled, hairy at the joints. *Leaves* opposite, oval, or cordate-ovate, joined by stipules; stipules with subulate, ciliate segments. *Flowers* axillary. *Calyx* 2-leaved, subulate, persistent. *Corolla* pubescent within. *Fruit* composed of 2 connate carpels each containing 1 seed.
White. ♃. May—October. Damp soils, very common.

3. D. Hirsuta. *Stem* hirsute, slender, procumbent. *Leaves* narrow-lanceolate, the whole plant hispid. In other respects it resembles the preceding species.

Genus III. CEPHALANTHUS.

Flowers in globose heads. *Calyx* superior, small, 4-cleft. *Corolla* tubular, 4-cleft. *Stamens* 4. *Style* exserted. *Capsule* 2-celled, 2-seeded.

1. C. Occidentalis. A shrub, much branched. *Leaves* opposite and ternate, ovate-lanceolate, entire, upper surface glabrous, lower pubescent on the veins; petioles short, winged. *Flowers* axillary and terminal; peduncles pubescent. *Corolla* hairy within, with 4 obtuse segments. *Anthers* sagittate. *Capsule* angled; receptacle globose. *Button wood.*

White. ♄. July. In wet places common. 6–15 feet.

Genus IV. HEDYOTIS.

Calyx 4-parted, persistent. *Corolla* shorter than the calyx; limb 4-cleft. *Stamens* 4. *Stigma* 1, sessile. *Capsule* 2-celled, many seeded, inferior.

1. H. Glomerata. *Stem* procumbent assurgent, pubescent branched. *Leaves* opposite, lanceolate, cuneate, sessile, entire, connected by stipules, with 2 or more subulate teeth. *Flowers* in clusters, whorled, axillary and terminal. *Calyx* persistent, hisped, with 1–3-bracts at the base. *Corolla* with a very short tube. *Stamens* short, inserted into the tube of the corolla. *Capsule* globose. *Seeds* 3-angled, attached to a central placentæ.

White. ♃. June.—Oct. Damp soils, common. 10–18 inches.

Genus V. PINCKNEYA.

Calyx superior, 5-parted, persistent, somewhat colored. *Corolla* with a 5-cleft border. *Stamens* 5. *Style* 1. *Capsule* 2-celled.

1. P. Pubens. A large shrub, with numerous stems from each root; young branches tomentose. *Leaves* opposite, lanceolate, entire, shining on the upper surface, with a few hairs, tomentose on the lower; petiole tomentose.—*Flowers* in axillary and terminal panicles; segments of the calyx sometimes equal, at others one or two of them resembling bracts. *Corolla* tomentose, with a somewhat greenish tube; segments oval. *Capsule* nearly globose. *Seeds* flat.

Purple. ♄. May—June. Wet soils. 15–20 feet.

Genus VI. MITCHELLA.

Calyx 4 toothed. *Corolla* superior, in pairs upon the same germ. *Stamens* 4. *Style* 1. *Fruit* didymous, 4-seeded.

1. M. Repens. *Stem* creeping, branching, glabrous, rooting at the joints. *Leaves* ovate, or nearly cordate, entire, glabrous, deep green, with whitish veins, evergreen. *Flowers* axillary, solitary, on short peduncles. *Corolla* hairy on the inside, fragrant. *Fruit* red, eatable. *Partridge berry.*

White. ♃ Early Spring. Rich soils.

Order LXXII. CAPRIFOLIACEÆ.

Calyx superior, 4–5-toothed generally bracteate. *Corolla* superior, lobed, sometimes irregular; with the segments alternating with those of the calyx. *Stamens* 4–5. *Ovary* 1–5-celled, cohering with the calyx. *Ovules* pendulous, few. *Style* 1, exserted. *Stigmas* 1–3. *Fruit* indehiscent, gener-

ally fleshy, crowned by the limb of the calyx, 1–5-celled. *Seeds* 1–2, or several in each cell. Shrubs with opposite leaves, exstipulate.

Genus I. CAPRIFOLIUM.

Calyx 5-toothed, very small. *Corolla* campanulate, 5-cleft, often irregular, with a long tube. *Stamens* 5. *Style* 1, filiform. *Fruit* 3-celled, few seeded.

1. C. Sempervirens. *Stem* twining, running over trees. *Leaves* oblong, oval, smooth on the upper surface, glaucous, and somewhat hairy on the under, the lower ones petiolate, the upper connate. *Flowers* in verticillate spikes. *Calyx* very small, persistent. *Corolla* funnel form, with 5 acute segments. *Stamens* inserted into the tube near the summit. *Fruit* red, with 4 seeds in each cell. *English Honeysuckle. Woodbine.*
Bright red. ♄ April—Oct. In damp soils.

2. C. Flavum. *Stem* twining, running over shrubs. *Leaves* oval, slightly cordate, glabrous, obtuse, deciduous, glaucous underneath, connate at the base. *Flowers* in terminal verticillate spikes. *Corolla* ringent, the upper lip broad, 4-cleft, reflexed; lower one entire, reflexed; tube hairy within.
Yellow, or orange. ♃ March—April. Upper Dist. Car.

3. C. Gratum. *Stem* twining. *Leaves* perennial, obovate, mucronate, pale underneath, upper ones connate. *Flowers* in verticillate spikes. *Corolla* ringent, with a long tube.
Scarlet. ♃. June—September. Mountains.

4. C. Parviflorum. *Stem* twining. *Leaves* deciduous, connate, glaucous beneath. *Flowers* nearly capitate, with large, perfoliate bracts. *Corolla* ringent, gibbous at the base.
Yellow. ♃. June—July. Mountains.

Genus II. DIERVILLA.

Calyx oblong, 5-cleft. *Corolla* funnel form, with 5 unequal segments. *Stamens* 5. *Style* 1. *Capsule* 4-celled, many seeded.

1. D. Canadensis. A small shrub. *Leaves* ovate, serrate, acuminate, on short petioles, glabrous; peduncles axillary and terminal, 3-flowered. *Corolla* small.
Yellow. ♄. June—July. Mountains.

Genus III. SYMPHORIA.

Calyx 5-toothed. *Corolla* with 5 nearly equal segments. *Stamens* 5. *Fruit* 4-celled, 4-seeded, sometimes 2-celled by abortion.

1. S. Glomerata. A small shrub. *Leaves* broad-lanceolate, entire, nearly sessile. *Flowers* small, numerous, clustered, axillary. *Fruit* purple, crowned by the calyx.
Red and yellow. ♃. July—Sept. Mountains. 3–4 feet.

Genus IV. TRIOSTEUM.

Calyx 5-cleft, with linear-lanceolate lobes, as long as the corolla. *Corolla* tubular, nearly equally 5-lobed, gibbous at the

base. *Stamens* 5. *Style* 1. *Berry* 3-celled, 3-seeded, crowned by the calyx.

1. T. PERFOLIATUM. *Stem* erect, pubescent. *Leaves* connate, spatulate, lanceolate, scabrous above, tomentose beneath, acuminate. *Flowers* axillary, verticillate, sessile. *Calyx* persistent, with linear segments. *Fruit* a dry, purple berry, crowned with the calyx.
Purple. 4. June—Aug. Upper district Carolina. 2–3 feet.

2. T. ANGUSTIFOLIUM. *Stem* erect, hairy. *Leaves* scarcely connate. *Flowers* solitary, on short, opposite peduncles.
Yellow. 4. June—July. Mountains. 2–3 feet.

GENUS V. VIBURNUM.

Calyx 5-toothed, persistent. *Corolla* campanulate, or rotate, 5-lobed. *Stamens* 5. *Stigmas* 3. *Style* none. *Fruit* an ovate, 1-seeded berry, crowned by the calyx.

1. V. ACERIFOLIUM. A small shrub. *Leaves* slightly cordate, 3-lobed, acuminate, sharply serrate, pubescent beneath; petioles hairy. *Flowers* in cymes, on long peduncles. *Fruit* oval, compressed, black.
White. ♄. May—June. Mountains. 4–6 feet.

2. V. DENTATUM. A shrub, nearly glabrous. *Leaves* orbicular, ovate, on long petioles, with large serratures, plaited. *Flowers* in large terminal cymes. *Fruit* nearly globose, blue, small.
White. ♄. March—April. Common. 8–15 feet.

3. V. LENTAGO. A shrub, glabrous. *Leaves* broad-ovate, acuminate, sharply serrate, sometimes slightly cordate or oval. *Fruit* black.
White. ♄. June. Banks of streams. 10–20 feet.

4. V. PRUNIFOLIUM. A shrub, with glabrous, virgate branches. *Leaves* obovate, acute, sometimes nearly orbicular or oval, glabrous, sharply serrate, *Flowers* in large cymes, lateral. *Fruit* oval, dark blue. *Black haw. Sloe.*
White. ♄. April—May. Common.

5. V. NUDUM. A shrub, with virgate branches, the old ones glabrous, the young clothed with a ferruginous pubescence. *Leaves* opposite, oval, with revolute margins, glabrous on the upper surface, with veins beneath, pubescent. *Flowers* in naked, terminal cymes, on jointed peduncles. *Calyx* white. *Corolla* with reflected, obtuse segments. *Fruit* blue.
White. ♄. April—May. Common. 4–12 feet

6. V. OBOVATUM. A shrub, with virgate branches. *Leaves* obovate, cuneate, crenulate, dentate, or entire, crowded near the summit, the lower leaves broader than the upper. *Flowers* in sessile cymes. *Fruit* nearly globular.
White. ♄. April—May. Common in middle Car. Ga. 4–8 feet.

7. V. CASSINOIDES. A shrub, glabrous. *Leaves* ovate-lanceolate, the lower ones obovate, the upper lanceolate, the intermediate ovate, margin slightly revolute; petioles keeled without glands. *Berries* nearly black, in other respects resembles the preceding species.

8. V. LÆVIGATUM. A small shrub, much branched; branches sprinkled with a brown dust. *Leaves* small, lanceolate, cuneate, nearly sessile, upper ones dentate, shining on the upper surface, the under dotted with brown dust. *Flowers* in small cymes, nearly sessile.
White. ♄ March—April. Low country, 2–4 feet.

9. V. NITIDUM. A low glabrous shrub, with quadrangular branches. *Leaves* linear-lanceolate, shining on the upper surface, entire, or slightly serrate.
White. ♄ April—May. Low country. 2–3 feet.

Genus 6. SAMBUCUS.

Calyx 5-parted. *Corolla* 5-cleft. *Stamens* 5. *Stigmas* 3. *Fruit* globose, 3-seeded berry.

1. S. Canadensis. A shrub thickened at the joints with glabrous branches. *Leaves* generally bi-pinnate; leaflets oblong-oval, acutely serrate, acuminate, glabrous, shining. *Calyx* small. *Corolla* rotate, with revolute oval segments. *Flowers* in lax cymes. *Fruit* globose, black.
White. ♄ April—May. Wet grounds. Common. 8–15 feet.

2. S. Pubescens. A small shrub, with the bark somewhat tuberculate. *Leaves* pinnate, leaflets 2–3 pairs, oval-lanceolate, acuminate, pubescent beneath. *Flowers* in crowded racemose cymes. *Fruit* red.
White. ♄ June—July. Mountains.

Order LXXIV. STELLATÆ.

Calyx superior, 4-lobed, or the wing nearly wanting. *Corolla* rotate, or tubular, regular, inserted into the calyx, with the lobes equal in number to the calyx. *Stamens* 4. *Ovary* 2-celled, with solitary erect ovules. *Style* 1. *Stigmas* 2. *Fruit* an indehiscent pericarp, 2-celled, 2-seeded. Herbaceous plants with whorled leaves. *Stems* quadrangular. *Flowers* minute.

Genus I. GALIUM.

Calyx with the tube ovate-globose, or oblong; limb nearly wanting. *Corolla* rotate, 4-parted. *Stamens* 4. *Style* 2-cleft. *Fruit* didymous.

1. G. Trifidum. *Stem* procumbent, assurgent, much branched, with the angles retrorsely aculeate. *Leaves* 4–6 in a whorl, linear, obtuse, scabrous on the margin and midrib. *Flowers* axillary 1–3 in each whorl. *Fruit* purple, smooth.
White. ♃ April—July. Damp soils.

2. G. Latifolium. *Stem* erect, glabrous. *Leaves* by fours, narrowed at the base, flat, oval, with hispid margins, acute. *Flowers* on divaricate peduncles. *Fruit* frequently 1-seeded from the abortion of the other, smooth.
Purple. ♃ June—July. Mountains.

3. G. Uniflorum. *Stem* procumbent, assurgent, smooth, sparingly branched. *Leaves* generally by fours, linear, acute, with revolute margins, somewhat scabrous; peduncles usually solitary, with a whorl of small leaves in the middle. *Fruit* purple, smooth.
White. ♃ May—July. In rich shaded grounds. 12 in.

4. G. Hispidulum. *Stem* procumbent, much branched, pubescent, rough. *Leaves* by fours, lanceolate, scabrous, dotted. *Flowers* axillary, terminal, on simple or compound peduncles. *Corolla* hairy. *Fruit* purple, scabrous, with short rigid hairs.
White. ♃ May—Oct. Sandy soils. Common.

5. G. Pilosum. *Stem* scabrous with the angles hairy, branches axillary, expanding. *Leaves* by fours, oval, entire, ciliate, sprinkled with hairs; peduncles dichotomous, axillary, solitary or by threes. *Fruit* hispid, white.
Purple. ♃ May—Sept. In dry soils.

6. G. Cuspidatum. *Stem* prostrate, small, glabrous. *Leaves* by sixes, at-

tenuate at the base, very acute at the summit, somewhat hairy, slightly ciliate; peduncles trifid. *Fruit* villous, with white hooked hairs.
White. 4 June—Aug. Damp shaded soils.

7. G. Circæzans. *Stem* erect, glabrous, sparingly branched. *Leaves* by fours, ovate, obtuse, ciliate. *Flowers* alternate, usually solitary, peduncles short. *Fruit* hispid with hooked hairs, nodding.
White. 4 June—Aug. In shaded rich soils.

Genus II. RUBIA.

Calyx 4-toothed. *Corolla* campanulate 4–5 cleft. *Stamens* 4–5. *Berries* 2, roundish and smooth, single seeded.
Nuttall.

1. R. Brownii. *Stem* hispid, decumbent. *Leaves* by fours, oval, peduncles solitary, single flowered. *Flowers* yellow. *Berries* purple, smooth.
In shady woods from Car. to Florida. *Pursh.* *Madder.*

Order LXXV. COMPOSITÆ.

Calyx united to the ovary, with the limb either wanting, or membranous, or divided into hair-like segments called *pappus*. *Corolla* ligulate, or tubular. *Stamens* 5, alternate with the teeth of the corolla. *Anthers* cohering into a cylinder.—*Ovary* inferior, 1-celled. *Style* simple. *Stigmas* 2 distinct or united. *Fruit* an indehiscent dry pericarp, crowned with the limb of the calyx. *Seeds* solitary, erect; albumen none. *Flowers* collected into dense heads, surrounded by an involucre.

The obvious characteristics of this order, are its compound flowers, and the union of the anthers. Herbs or shrubs. *Leaves* without stipules.

Sub-Order I. CICHORACEÆ.

Plants usually with a milky sap. Florets of the capitulum all ligulate and perfect.

(a.) Hawk-weed Tribe. Flowers yellow or purple.

Genus I. HIERACIUM.

Involucre imbricate; receptacle naked; pappus simple, persistent, setaceous. *Flowers* yellow, solitary or corymbose, perfect.

1. H. Venosum. *Stem* herbaceous, glabrous towards the summit, hairy at the base. *Leaves* all radical, ovate-oblong, little hairy on the upper surface, entire, margins ciliate, with dark red veins. *Flowers* in corymbose panicles; involucre glabrous. *Seed* striate, receptacle, dotted.
Veiny Hawkweed.
Yellow. 4. May—June. In shaded soils. 1–2 feet.

2. H. Marianum. *Stem* erect, villous and scabrous, leafy. *Leaves* sessile, obovate oblong, strigose, upper leaves small, lower ones denticulate. *Flowers* in irregular panicles, involucre hispid, tomentose; florets numerous.
Yellow. 4 Aug.—Sept. Mountains. 2–4 feet.

3. H. Gronovii. *Stem* leafy, erect, hairy, with a glandular pubescence. *Leaves* few near the base of the stem, ovate, sessile, ciliate, pubescent. *Flow-*

ers in terminal panicles, involucre cylindric covered with hispid glands. *Seed* oblong, furrowed.

Yellow. 4. June—Sept. In dry soils. Common.

4. H. PANICULATUM. *Stem* leafy, erect, pubescent beneath, glabrous above. *Leaves* lanceolate, denticulate, glabrous. *Flowers* in large compound panicles, on slender peduncles, involucre with the interior leaves very narrow, glabrous. *Seed* furrowed.

Yellow. 4. July—Sept. Mountains.

GENUS II. PRENANTHES. (*Syn. Harpalyce.*)

Involucre cylindric, in a single row, somewhat imbricate at the base with a few appressed scales, receptacle slightly pitted. *Florets* perfect. *Stigmas* somewhat hispid, filiform. *Fruit* narrow, angled, pappus pilose, erect, persistent, colored, scabrous.

1. P. ALTISSIMA. *Stem* erect, branching, glabrous. *Leaves* 3-lobed alternate, angled, nearly hastate, slightly dentate, scabrous on the margin. *Flowers* in axillary racemes, nodding. *Involucre* about 5-flowered, cylindrical. *Seeds* angular striate.

Yellow. 4. Aug.—Sept. 4–6 feet.

2. P. CORDATA. *Stem* erect, generally glabrous. *Leaves* ovate-lanceolate, petioled, cordate at the base, irregularly toothed, ciliate, upper leaves lanceolate. *Flowers* in racemose panicles, nodding, 6–8 flowers in a head; leaves of the involucrum usually 8, with membranaceous margins. *Seeds* striate, with scabrous pappus.

Yellow. 4. July—Aug. Mountains. 4–6 feet.

3. P. DELTOIDEA. *Stem* simple, slender. *Leaves* on long petioles deltoid acuminate, acutely denticulate, lower ones triangular, glabrous, slightly glaucous beneath. *Flowers* in axillary racemes, 5 in each capitulum, involucrum, with 5 equal linear leaves, with membranaceous margin. *Seeds* glabrous, angled, pappus, hairy.

Purple. 4. Sept. Mountains. 2 ft.

4. P. VIRGATA. *Stem* erect, simple, glabrous. *Leaves* sessile, runcinate somewhat amplexicaule, upper leaves, narrow lanceolate. *Flowers* in long terminal racemes, pendulous, 10–12 florets in a capitulum; involucrum, with 8 oblong, obtuse leaves, fringed at the summit. *Seeds* cylindric, striate, pappus scabrous.

Pale purple. 4. Oct. Pine barrens, common.

5. P. CREPIDINEA. *Stem* branching towards the summit. *Leaves* broad-lanceolate, attenuate at the base, upper ones sessile, denticulate, scabrous. *Flowers* in terminal panicles composed of nodding clusters; involucrum with 8–10 nearly glabrous leaves; florets numerous, pappus scabrous.

4. Sept. Mountains. 4–6 feet.

6. P. ALBA. *Stem* herbaceous, much branched, pubescent, slightly angled; radicle leaves hastate, angled, toothed; upper leaves spatulate obovate-lanceolate, toothed and angled. *Flowers* in loose panicles, in terminal clusters, nodding, florets 8–12 in a capitulum; involucrum with 8 oblong pubescent leaves fringed at the summit. *Seeds* cylindrical, striate, pappus 7-scabrous. *Gall of the earth.*

Pale yellow. 4. Sept.—Oct. Dry soils. 2 ft.

7. P. SERPENTARIA. *Stem* erect, nearly glabrous. *Leaves* hastate, radicle ones palmate, caaline ones on long petioles, sinuate pinnatifid, somewhat 3-lobed, middle segment 3-parted, with a long, attenuated base, upper leaves lanceolate. *Flowers* in terminal, paniculate racemes, nodding; florets 12 in each capitulum; involucrum 8-cleft. *Lion's foot.*

Purple. 4. August—October. Upper district of Carolina.

(b.) Dandelion tribe. Flowers yellow, with a single exception.

Genus III. LEONTODON.

Involucre imbricate, with a few loose scales at the base; florets perfect; receptacle naked, pappus, stiped.

1. L. Taraxacum. *Scapes* several from each root, terete, glabrous, each 1-flowered. *Leaves* all radicle, runcinate, oblong; segments lanceolate, toothed, slightly hairy when young; involucrum with numerous leaves, equal, sometimes colored; scales reflexed. *Seeds* oblong, angled, pappus stipitate hairy; receptacle convex

Yellow. ♃. March—April. Damp soils. Introduced.

Genus IV. KRIGIA. (*Syn. Cynthia.*

Involucrum many leaved, simple, receptacle naked, pitted, pappus double, exterior one chaffy, short, the interior pilose, rough. *Stigmas* linear-ligulate.

1. K. Virginica. A very small plant, glaucous, the primary leaves nearly round, entire, the rest lirate, nearly glabrous. *Scapes* glabrous, 1-flowered, becoming elongated by age; involucrum glabrous.

Bright yellow. ☉. April—May. Sandy soils. Near Columbia.

2. K. Caroliniana. *Scapes* hairy, glandular, long. *Leaves* runcinate, pinnatifid, or lanceolate, lateral lobes acute, much smaller than the terminal one, sometimes dentate, sprinkled with jointed hairs; involucrum 10–20-parted, with linear-lanceolate segments, glabrous. *Corolla* slightly hairy at the base. *Seeds* obconic, striate. *Pappus* composed of 5 nearly round scales, and 5 scabrous bristles.

Bright yellow. ♃. Feb.—April. Sandy soils, common.

3. K. Dandelion. *Scape* bearing a few glandular hairs near the summit, slightly glaucous. *Leaves* oblong, narrow, slightly obovate, secondary leaves linear-lanceolate, long, somewhat glaucous; involucrum 10–12-parted.

Yellow. ♃. April—May. Southern Georgia.

4. K. Amplexicaulis. *Stem* bearing leaves, somewhat branched, glaucous; radicle leaves spatulate, lanceolate, dentate, cauline ones somewhat amplexicaule, lanceolate or ovate; involucrum generally 12-parted. *Flowers* solitary, at the extremity of the branches, large, exterior pappus consisting of 8 scales.

Yellow. ♃. June—July. Middle & upper dis. of Car. Ga. 12–14 in.

Genus V. APARGIA.

Involucrum many parted, imbricate, with a few appressed scales at the base; florets perfect; receptacle dotted. *Fruit* compressed, somewhat fusiform, pappus plumose, persistent, sessile, pedunculate.

1. A. Orontium. *Stem* erect, branching, hairy. *Leaves* lanceolate. *Flowers* somewhat spiked; involucre digitate.

Yellow. ☉. July.

2. A. Tenellum. *Stem* simple, glabrous. *Leaves* opposite, linear, acute. *Flowers* axillary, on short peduncles; involucre bell form. *Eaton.*

Blue. ☉. July.

(c.) Lettuce Tribe. Flowers usually yellow, with a milky juice and bitter taste.

Genus VI. LACTUCA.

Involucre cylindrical, imbricate, scales membranaceous at

the margin. Receptacle naked. Florets perfect. *Seeds* smooth, pappus simple, stipitate.

1. L. ELONGATA. *Stem* glabrous. *Leaves* long, smooth beneath, the lower ones runcinate, amplexicaule, entire, toothed, the upper ones lanceolate; involucre imbricate, reflected when old; florets numerous. *Flowers* in corymbose panicles. *Seeds* compressed, pappus stipitate, hairy. *Fire weed.*
Yellow. 4. July—September. 4–7 feet.

2. L. GRAMINIFOLIA. *Stem* erect, simple, glabrous. *Leaves* sessile, long, tapering to an acute point, narrow, sometimes amplexicaule, usually undivided. *Flowers* in loose, leafless panicles. *Leaves* of the involucre subulate. *Seeds* compressed, lanceolate.
Purple. 4? April—September. In dry soils.

3. L. SAGITTIFOLIA. *Stem* erect, terete, glabrous. *Leaves* sessile, sagittate, tapering towards the apex, entire, glabrous. *Flowers* in loose, terminal panicles; involucre with glabrous, subulate leaves. *Seed* compressed, pappus hairy.
Yellow. 4. July—Sept. Middle Carolina. 4–6 feet.

4. L. VILLOSA *Radicle leaves* slightly runcinate, spatulate, ovate, sometimes angled, acutely toothed. *Petiole* winged, upper surface glabrous, lower pubescent. *Cauline leaves* ovate, acuminate, toothed in the middle, petioled. *Sonchus acuminatus of Ell.*
Purple. 4. August—September. Rich soils

GENUS VII. BORKHAUSIA.

Involucre many leaved, with a dorsal tooth near the summit, surrounded at the base with a few short subulate scales. *Pappus* hairy, stipitate. *Receptacle* naked. *Florets* perfect.

1. B. CAROLINIANA. *Stem* erect, few flowered, pubescent towards the summit. *Leaves* oblong-lanceolate, old ones pinnatifid, pubescent along the margins, narrow. *Flowers* few, solitary, on the summit of the branches; florets numerous. *Seed* compressed, striate.
Yellow. 4 March—July. Common.

GENUS VIII. SONCHUS.

Involucre many leaved, imbricate, connivant at the summit. *Florets* perfect. *Receptacle* pitted, naked, or scabrous.—*Stigma* hispid. *Pappus* hairy.

1. S. OLERACEUS. *Stem* terete, fistulous, succulent, glabrous, branching. *Leaves* oblong-lanceolate, amplexicaule, sinuate, pinnatifid, segments acute, slightly toothed. *Flowers* in axillary umbels, with tomentose spots on the peduncles. *Seed* oblong compressed, sulcate. *Sow Thistle.*
Yellow. ☺ March—July. Common.

2. S. MACROPHYLLUS. *Stem* erect. *Leaves* lyrate, pubescent, and hispid on the under surface, cordate at the base, large. *Flowers* in panicles. *Peduncles* hirsute.
Blue. 4 August—Sept. In shaded, damp soils. 4–7 feet.

3. S. FLORIDANUS. *Stem* erect, glabrous. *Leaves* narrow, lanceolate, lyrate, sometimes with 1 or two runcinate segments, acutely denticulate. *Flowers* in long slender panicles. *Peduncles* scabrous.
Blue. 4 July—Sept. Upper districts Car. and Ga. 3–5 feet.

4. S. CAROLINIANUS. *Stem* erect, glabrous, fistulous. *Leaves* lanceolate acute, toothed, undulate, auriculate, somewhat clasping at the base *Flowers* in lateral and terminal umbels. *Seed* compressed, striate. *Pappus* sessile.
Yellow. ☺ March—April. In river swamps. 1–3 ft.

Genus IX. CICHORIUM.

Involucre surrounded with leafy scales. *Florets* perfect. *Receptacle* naked, or somewhat chaffy. *Pappus* plumose, sessile, unequal.

1. C. Intybus. *Stem* with numerous rough branches. *Leaves* runcinate. *Flowers* axillary, sessile in pairs, large. *Succory or Endive.*
Blue. ♃ July—Sept. Introduced. 2-3 ft.

Sub-Order II. CARDUACEÆ. (*Thistle Tribe.*

Florets of the capitulum tubular. *Receptacle* chaffy. *Stigma* articulated. *Leaves* alternate, often spiny.

Genus X. CNICUS. (*Syn. Carduus*)

Involucre ventricose, imbricate, with spinose scales. *Florets* perfect. *Receptacle* hairy. *Pappus* plumose, or pilose.

1. C. Altissimus, *Stem* erect, branching. *Leaves* sessile, oblong-lanceolate, scabrous, tomentose beneath, dentate, ciliate, radicle ones pinnatifid. *Flowers* terminal. *Involucre* cylindrical ovate; scales ovate, spinous, appressed, pale. *Receptacle* villous.
Purple. ♃ July—Sept. Upper districts Car. & Ga. 2–3 feet

2. C. Muticus. *Stem* erect, slender, branching. *Leaves* pinnatifid, woolly, tomentose beneath; segments with spines, somewhat bracteolate, occasionally 3-lobed, pale, acute. *Branches* naked, 1-flowered. *Involucre* globose; scales without spines, lanuginous.
Purple. ♃ July—Sept. Mountains. 2–6 ft.

3. C. Repandus. *Stem* erect, sometimes branching, but usually simple, woolly. *Leaves* oblong, narrow, amplexicaule, repand, sinuate, fringed with spines, woolly beneath. *Branches* 1 flowered, leafy. *Involucre* with ovate-lanceolate scales, erect, spinous, slightly woolly. *Receptacle* bristly. *Pappus* plumose.
Purple. ♃ June—July. 2–3 ft.

4. C. Virginianus. *Stem* simple, angled, tomentose towards the summit. *Leaves* sessile, narrow lanceolate, with spiny teeth, acute, slightly hairy on the upper surface, tomentose beneath. *Flowers* solitary, terminal. *Involucre* ventricose; scales appressed, caronate, ovate. *Seeds* slightly angled, oblong. *Pappus* plumose. *Receptacle* bristly.
Purple. ♃ June—Sept. Pine barrens. Common. 2–3 ft.

5. C. Glaber. *Stem* erect, furrowed, sprinkled with hairs, branching. *Leaves* sessile, pinnatifid, very long, hairy along the veins, spiny along the margins and angles; segments 3–5-lobed. *Flowers* in panicles. *Peduncles* slender, slightly hairy; scales of the involucre, viscid, with a short spine. *Seeds* glabrous. *Pappus* plumose. *Receptacle* bristly.
Purple. ♃ May—Aug. In cultivated lands. 4–6 ft.

6. C. Discolor. *Stem* erect, hairy. *Leaves* sessile pinnatifid; segments 2-lobed, spinous, hairy on the upper surface, tomentose beneath. *Flowers* solitary, terminal, on leafy branches; scales of the involucre ovate, terminated by a long spine. *Seed* smooth. *Pappus* plumose.
Purple. ♃ June—July. Upper districts Car. and Ga.

7. C. Horridulus. *Stem* erect, simple, woolly. *Leaves* sessile, pinnatifid, crowded near the base; segments lobed, dentate, spinous, hairy on the upper surface, woolly beneath. *Flowers* solitary, axillary and terminal, on short pe-

duncles. *Bracts* numerous, spinous; spines arranged in pairs. *Involucre* ventricose; scales lanceolate, slightly hairy. *Seeds* shining. *Pappus* plumose.
Purple. 4. March—April. Poor soils, common.

Genus XI. CENTAUREA.

Involucre scaly; scales lanceolate, imbricate. *Receptacle* bristly. *Florets* of the ray pistillate, funnel-shaped, irregular, those of the disk staminate. *Pappus* consisting of three series, the exterior a toothed margin, the middle one composed of 10 or 12 awns, the interior one short, hairy.

1. C. Benedicta. *Stem* prostrate, somewhat branched, woolly. *Leaves* sessile, pinnatifid, with acute segments, villous. *Flowers* solitary, terminal. *Involucre* ovate, with the scales terminated by a pectinate spine; florets of the ray 3-cleft, those of the disk 5-cleft. *Styles* undivided.
Yellow. ☉. June. Introduced.

Sub-Order III. CORYMBIFEREÆ.

Inflorescence often corymbose, but by no means always. *Capitula* usually with disk and ray florets. *Stigma* not articulated.

(*a.*) *Inulæ, Elicampane Tribe.*

Genus XII. STOKESIA.

Involucre leafy, imbricate. *Corolla* radiate; florets of the ray funnel form, irregular, all perfect. *Receptacle* naked. *Pappus* consisting of 4 bristles.

1. S. Cyanea. *Stem* herbaceous, leafy. *Leaves* lanceolate. *Flowers* solitary, large, ornamental; florets all perfect.
Blue or purple. 4. May. Carolina.

Genus XIII. LIATRIS.

Involucre imbricate, oblong; florets perfect. *Pappus* plumose, persistent, generally colored. *Fruit* pubescent, striate, ob-conic. *Anthers* entire at the base. Perennial. herbaceous plants, with alternate, entire leaves. *Style* bifid. *Flowers* usually purple, all tubular.

(*a.*) *Flowers in spikes or racemes. Root tuberous.*

1. L. Spicata. *Stem* simple, glabrous. *Leaves* linear-lanceolate, glabrous, acute, dotted, somewhat ciliate at the base. *Flowers* in terminal spikes, with bracteal leaves. *Involucre* cylindrical; scales oblong. Generally 8 florets in a capitulum, longer than the involucre. *Seeds* hairy, furrowed.
Gay feather. Button Snakeroot.
Purple. 4. Aug.—Oct. Pine barrens. 2–4 feet.

2. L. Pycnostachya. *Stem* simple, hairy. *Leaves* narrow, linear, pubescent. *Flowers* in long, clustered spikes. *Involucre* squarrose at the summit, appressed.
Purple. 4. September. Upper district of Carolina. 2–4 feet.

3. L. Graminifolia. *Stem* simple, glabrous, or slightly hairy. *Leaves* linear, long, with the midrib hairy and the margin scabrous. *Flowers* in a terminal spike, with bracts as long as the involucre. *Involucre* cylindrical, with about 6 florets; scales pubescent along the margin, mucronate. *Corolla* covered with glandular dots. *Seeds* hairy. *Pappus* uncolored.
Purple. 4. Sept.—Oct. In pine barrens. 2–4 feet.

4. L. Tenuifolia. *Stem* simple, slender, glabrous, lower leaves crowded, narrow, or linear, slightly hairy at the base; upper leaves, setaceous, scattered: *Flowers* in long racemes, with leafy pedicels. *Involucre* oblong, about 5-flowered; scales membranaceous along the margins. *Corolla* with glandular dots. *Seeds* hairy, pappus not colored.
Purple. 4. Aug.—Oct. Dry pine barrens. 2–4 feet.

5. L. Cylindracea. *Stem* slender, glabrous. *Leaves* linear, long, narrow, glabrous, upper ones pubescent along the margin, lower ones alternate at the base. *Flowers* few, in a terminal spike; involucre cylindrical, containing 14–20 florets; scales oblong, abruptly acuminate, pubescent along the margin. *Corolla* glandular, pappus, plumose.
Purple. 4. Aug.—Sept. Dry, sandy soils. Middle Ga. 1–2 feet.

6. L. Heterophylla. *Stem* simple, glabrous. *Leaves* lanceolate, glabrous, upper ones smaller, linear-lanceolate. *Flowers* in spiked heads, squarrose; scales of the involucre lanceolate, acute, naked.
Purple. 4. Aug.—Oct. So. Carolina, Georgia. 2–3 feet,

7. L. Pilosa. *Stem* simple, pubescent, streaked. *Leaves* linear, the lower linear-lanceolate, pubescent, fringed near the base. *Flowers* in long, leafy racemes; the lower peduncles compound; involucre oblong, with 10–14 florets; scales fringed, *Seeds* hairy, pappus not colored.
Purple. 4. Aug.—Oct. Pine barrens of Car. & Ga.

8, L. Gracilis. *Stem* slender, pubescent, streaked. *Leaves* linear, glabrous, slightly fringed at the base; upper leaves much smaller than the lower. *Flowers* in terminal racemes, peduncles hairy, with a few scales; involucre generally with seven florets; scales obovate, dotted, ciliate, colored at the summit. *Seeds* hairy; pappus colored.
Purple. 4. Sept.—Oct. Dry pine barrens. 2–3 feet.

9. L. Secunda. *Stem* reclining, usually curved, pubescent, lower leaves linear-lanceolate, somewhat fringed at the base. *Flowers* in long terminal racemes, secund; peduncles with 1–2 subulate scales; involucre with 4–5 florets, generally ten leaved. *Leaves* glabrous, pubescent along the margin. *Seeds* hairy. *Pappus* slightly plumose.
Purple. 4 August—Sept. Dry sand hills middle Car. & Ga. 2–3 ft.

10. L. Resinosa. *Stem* glabrous, radicle leaves, long, cauline leaves, numerous, crowded, all linear. *Flowers* in spikes, bracteate; involucre with obtuse scales, resinous, becoming hoary. *Seed* villous.
Purple, 4 August—Sept. Pine forests of Car. 1–2 ft.

11. L. Elegans. *Stem* erect, very pubescent. *Leaves* linear-lanceolate, scabrous beneath, cartilaginous along the margins. *Flowers* in a compact cylindrical raceme; peduncles with small leaves; involucre with 5 florets; leaves about 12, lanceolate, villous, interior ones colored. *Seeds* villous; pappus colored.
Purple. 4 August—Sept. Dry soils. 3–5 ft.

12. L. Scariosa. *Stem* erect, hairy. *Leaves* lanceolate, scabrous along the margin, pubescent, lower ones very long, attenuate at the base. *Flowers* in a terminal raceme; peduncles short, pubescent; involucre, with 14 florets; scales with scarious margins, slightly colored at the summit. *Seeds* hairy, pappus colored.
Purple. 4 August—Oct. Dry soils. Common. 2–4 ft.

13. L. Spherivdea. *Stem* erect, pubescent. *Leaves* lanceolate, acute, slightly coriaceous, glabrous, the lower broader than the upper ones. *Flowers* in terminal racemes; involucre nearly globular, with many florets, scales

obtuse, colored, sometimes fimbriate, dotted. *Seeds* hairy, pappus, slightly plumose.

Purple. 4 August—Oct. Middle and upper districts of Car. & Ga.

14. L. Squarrosa. *Stem* erect pubescent. *Leaves* long-linear with scabrous margins, glabrous, the upper ones frequently ciliate. *Flowers* few, in a terminal raceme; involucre cylindrical, with ovate ciliate scales, with expanding points. *Corolla* deeply cleft, segments hairy. *Seeds* hairy; pappus colored.

Purple. 4 Sept.—Oct. Dry pine barrens.

(*b*) *Flowers in Corymbs; roots fibrous.*

15. L. Paucíflora. *Stem* simple, glabrous. *Leaves* linear. *Flowers* in leafy virgate panicles; with the branches few flowered; involucre sessile, secund, 3-5-flowered; scales erect, lanceolate acute, glabrous. *Elliott.*

16. L. Paniculata. *Stem* erect, hairy, viscid, colored and branching towards the summit, radicle leaves spatulate lanceolate, dentate, glabrous; cauline leaves sessile, nerved, ovate-lanceolate, hairy. *Flowers* in terminal panicles; branches 4-6-flowered, involucre 4-5 florets, 6-8 leaved. *Corolla* viscid. *Seeds* hairy; pappus purple.

Purple. 4 Sept.—Oct. Pine barrens. 1-2 ft.

17. L. Odoratissima. *Stem* erect, simple, glabrous, striate, purple. *Leaves* ovate or lanceolate, radical ones spatulate, somewhat dentate; cauline ones clasping. *Flowers* in corymbose panicles; involucre usually with 7 florets, 10-12 leaved. *Leaves* appressed, glabrous. *Seeds* hairy; pappus colored.

Purple. 4 Sept.—Oct. 3-4ft.

18. L. Tomentosa. *Stem* erect, branching near the summit, branches hirsute, tomentose; radicle leaves cuneate lanceolate, tomentose; cauline leaves oblong, sessile. *Flowers* in terminal corymbs, involucre with about 20 florets; scales hairy at the base, with a membranaceous margin; pappus colored.

Purple.. 4 Sept.—Oct. Wet places. 2-3 ft.

19. L. Walteri. *Stem* simple, glabrous at the base, hairy near the summit. Radicle leaves lanceolate, attenuate at the base, glabrous; cauline ones smaller, diminishing in size towards the summit, sessile, hairy. *Flowers* in corymbs; involucre with many florets; scales colored, tomentose. *Seeds* hairy; pappus colored.

Purple. 4 Sept.—Oct. Southern Georgia.

Remarks. The root of the *Liatris Spicata* is said to possess powerful diuritic properties, and is used in the form of a decoction, as a gargle for sore throat.

The *L. Scariosa and Squarrosa*, are said to be an antidote to the poison of the Rattlesnake, and is used to cure the bite of this animal, and the former is known by our plantation negroes as the Rattlesnake's master.

Genus XIV. VERNONIA.

Involucre ovate, imbricate. Florets all perfect and tubular. Receptacle naked. *Stigma* bifid; pappus double, the exterior chaffy, the interior capillary.

1. V. Oligophylla. *Stem* erect, simple, branching towards the summit; striate pubescent, scabrous. Radicle leaves oval, coarsely dentate, acute; cauline ones crowded towards the base, scattered towards the summit; toothed, or serrate, scabrous above, pubescent beneath. *Flowers* in paniculate corymbs; scales of the involucre ciliate, pubescent beneath. *Flowers* in paniculate corymbs; scales of the involucre ciliate, pubescent, ovate-lanceolate, *Seeds* oblong, hairy. *Black root.*

Purple. 4 June—July. Damp pine barrens. 2-3 ft.

2. V. Scaberrima. *Stem* simple, slender, pubescent towards the base, nearly glabrous towards the summit. *Leaves* crowded on the lower part of the stem, sessile, linear-lanceolate, scabrous and hairy on both surfaces, mar-

gins revolute denticulate. *Flowers* in terminal corymbs; involucrum, with lanceolate ciliate scales, with a subulate point. *Seeds* striate, hairy

Purple. 4. June—August. Pine barrens. 2–3 feet.

3. V. Angustifolia. *Stem* simple, erect, scabrous. *Leaves* long-linear, numerous, entire or slightly denticulate, margins revolute, pubescent beneath, *Flowers* in terminal corymbs; involucre with ovate, lanceolate scales, terminated by a subulate point. *Seeds* striate hairy.

Purple. 4. June—August. Common. 3-4 feet.

4. V. Noveboracensis. *Stem* erect, pubescent, branching towards the summit. *Leaves* numerous, narrow, lanceolate, long, upper surface glabrous, the lower pubescent. *Flowers* in large fastigiate corymbs; involucre hemispherical, with ovate lanceolate scales, terminated by a long subulate point. *Seeds* striate, somewhat hairy, exterior pappus subulate.

Purple. 4. July—September. Moist rich lands. 5-10 feet.

5, V. Tomentosa. *Stem* erect, slender, tomentose towards the summit.—*Leaves* narrow-lanceolate, long, acutely serrate, upper surface scabrous, lower tomentose. *Flowers* in fastigiate corymbs, involucre with ovate lanceolate scales, with a long filiform point, hairy.

Purple. 4. July—August. Wet soils. 3-6 feet.

6. V. Prælta. *Stem* erect, angled, branching towards the summit, pubescent. *Leaves* numerous, lanceolate serrate, somewhat scabrous, pubescent beneath. *Flowers* in fastigiate corymbs; involucre with ovate, acute scales, unarmed.

Purple. 4. August. Upper district of Carolina and Georgia. 4-8 ft.

7. V. Altissima. *Stem* erect, glabrous. *Leaves* lanceolate, serrate, slightly scabrous. *Flowers* in small, terminal corymbs; involucre small, with ovate, ciliate, appressed scales, slightly mucronate. *Seeds* striate.

Purple. 4, Aug.—Oct. Georgia, damp places. 6–10 feet.

Genus XV. BACCHARIS.

Involucre imbricate, cylindric; scales sub-coriaceous, ovate, Receptacle naked; florets tubular, monœcious, with sterile and fertile intermixed. *Staminate florets* with exserted anthers, unawned at the base, pappus slightly plumose. *Fertile florets* with capillary pappus.

1. B. Angustifolia. A shrub. *Stem* erect, glabrous, branching, young branches angled, dotted. *Leaves* sessile, entire, linear, obscurely 3-nerved. *Flowers* in compound panicles, generally axillary, solitary. *Involucre* slightly ventricose, with glabrous, ovate, lanceolate leaflets; sterile florets tubular, white, with a short, undivided style; fertile florets 5-cleft. *Stamens* wanting. *Style* 2-cleft. *Seeds* striate, cylindric.

White. ♄. Sept.—Oct. On the coast. 1–10 feet.

2. B. Halimifolia. A shrub, with erect branches, glabrous, young branches angled. *Leaves* sessile, obovate, cuneate, dentate towards the summit, upper ones usually entire, covered with whitish scales or dust. *Flowers* in leafy compound panicles, axillary and terminal. *Style* of the fertile florets 2-cleft, rather shorter than the stamens. *Seeds* striate, oblong.

White. ♄. Sept.—Oct. Low country. 6–12 feet.

3. B. Sessiliflora. A shrub with angular, erect, virgate branches, glabrous. *Leaves* nearly sessile, obovate cuneate, dentate towards the summit. *Flowers* sessile, axillary, scattered, involucre, with obtuse scales reddish at the summit.

White. ♄. September—October. On the sea cost. 3–5 feet.

Genus XVI. PTEROCAULON. (*Syn Conyza.*)

Involucre imbricate. leaflets somewhat obovate, acute, appressed, tomentose. *Flowers* pistillate and perfect, intermingled, the pistillate ones slender, with the border 3-toothed; the perfect ones with the border 5-cleft. *Anthers* very short. *Style* 2-cleft. *Stigmas* glandular.

1. P. Pycnostachyum. *Stem* erect, simple, winged, densely tomentose, white. *Leaves* lanceolate, sessile, decurrent, dentate, white, tomentose beneath. *Flowers* in compact spikes. *Involucre* densely tomentose. *Seeds* angled, pubescent, receptacle naked.
White. 4. May—August. Dry, sandy soils. 1-2 feet.

Genus XVII. GNAPHALIUM.

Involucre imbricate, with scales oblong, membranaceous, usually colored. Pistillate and perfect florets intermingled.—*Pistillate florets* slender, 5-toothed. *Stamens* none. *Perfect florets*, stamens as long as the corolla. *Seeds* glabrous, pappus pilose. Receptacle naked.

1. G. Polycephalum. *Stem* erect, branching towards the summit, white, tomentose. *Leaves* sessile, linear-lanceolate slightly undulate, glabrous above, tomentose and white beneath. *Flowers* in terminal corymbs: involucre conical, leaflets oblong, tomentose at the base. *Seeds* cylindrical glabrous, pappus, pilose.
White. ☺. September—October. Very common. 1-2 feet.

2. G. Peruvianum. *Stem* erect or decumbent, simple, tomentose. *Leaves* linear-spatulate, tomentose beneath, slightly mucronate, undulate. *Flowers* in sessile, axillary clusters; involucre with the leaflets ovate, glabrous, inner ones tinged with purple. *Seed* oblong, scabrous.
Purple. 4 March—May. Common. 1-12 inches.

Genus XVIII. ANTENNARIA. (*Syn. Gnaphalium.*)

Involucre many leaved, imbricate; scales oblong, scarious, colored. *Flowers* dioecious. *Seeds* glabrous. *Pappus* plumose. *Receptacle* naked.

1. A. Margaritaceum. *Stem* erect, branching near the summit. *Leaves* linear-lanceolate, tapering, acute, tomentose beneath, entire. *Flowers* in fasciculate corymbs. *Involucre* many leaved, with ovate, obtuse, white scales.
Yellow. 4. August—Sept. Mountains. 1-2 feet.

2. A. Plantagineum. *Stem* simple, with procumbent shoots, white, tomentose. *Radical* leaves spatulate, ovate, entire, nerved, tomentose beneath; cauline ones spatulate, lanceolate. *Flowers* in small, terminal corymbs. *Involucre* with the inner scales long, obtuse, colored.
Reddish white. 4. May—June. Carolina, Georgia.

Genus XIX. CONYZA.

Calyx imbricate, scales sub-linear, somewhat scarious, appressed, receptacle naked. *Flowers* pistillate and perfect; the exterior ones fertile, 5-cleft; pappus simple, plumose.—*Seeds* hairy.

1. C. CAMPHORATA. *Stem* herbaceous, succulent, slightly pubescent. *Leaves* ovate-lanceolate, acute, denticulate. *Flowers* in axillary, terminal corymbs, shorter than the leaves; scales of the involucre acute, as long as the florets. This plant, when bruised, gives out a strong, disagreeable odor.
Purple. ♃. August—Sept. Salt marshes. *Marsh Flea-bane.*

2. C. MARYLANDICA. *Stem* erect, rather succulent. *Leaves* ovate-lanceolate, denticulate, pubescent. *Flowers* in corymbs, scales of the involucre linear or ovate. *Seeds* minute, pappus, short, consisting of 20–30 rays.
Purple. ☉. July—Aug. On the coast of Carolina and Georgia.

GENUS XX. ARNICA.

Involucre hemispherical; leaflets equal, longer than the disk, receptacle naked, pappus simple; florets of the ray often with 5 filaments, destitute of anthers.

1. A. NUDICAULIS. *Stem* simple, hirsute, somewhat viscid. Radicle leaves opposite, sessile, somewhat viscid, decussate, dentate. *Stem* nearly leafless, or with 1–2 pair of ovate, sessile leaves. *Flowers* in terminal racemes, on small branches at the summit of the stem; leaves of the involucre hirsute, in a single series. *Style* 2-cleft. *Seed* obovate, striate, pappus pilose. *Leopard's-bane.*
Yellow. ♃. April—May. Damp pine barrens, common. 1–2 feet.

GENUS XXI. CHRYSOPSIS.

Involucre imbricate; ray florets pistillate, those of the disk perfect. *Anthers* naked at the base; pappus double, the outer chaffy and minute, the inner pilose and scabrous, many rayed. *Seeds* obovate, villous. *Receptacle* naked.

1. C. ARGENTEA. *Stem* branching towards the summit, silky. *Leaves* lanceolate, long, linear, entire, somewhat rigid, covered with a silky pubescence. *Flowers* in terminal corymbs. *Involucre* pubescent, imbricate; leaflets subulate, acute; ray florets 10–11, those of the disk numerous. *Seeds* oblong, villous or hispid; pappus colored.
Yellow. ♃. July—October. Dry soils.

2. C. GRAMINIFOLIA. *Stem* erect, silky, leafy towards the summit. *Leaves* entire, lanceolate, linear, covered with a silky pubescence. *Flowers* in compound corymbs. *Stamens* at first yellow, afterwards white. *Seed* oblong; pappus colored, but lighter than the preceding.
Yellow. ♃. July—Oct. Sandy soils, common. 1–2 feet.

3. C. PINIFOLIA. *Stem* glabrous, rigid. *Leaves* numerous, crowded, linear, rigid, those of the branches small, linear. *Flowers* in terminal corymbs; involucre imbricate, with linear-lanceolate scales, woolly at the point. *Anthers* white, conspicuous. *Seeds* long, hairy, hispid, exterior pappus subulate, whitish, the interior scabrous, brown.
Yellow. Sept.—Oct. Sand hills, middle Georgia. 18–20 in.

4. C. MARIANA. *Stem* erect, hairy, simple. *Leaves* oblong-lanceolate, serrate, acute, the upper ones sessile, the lower ones spatulate, hairy on the under surface. *Flowers* in a simple corymb; involucre many leaved, viscidly and glandular pubescent. *Anthers* 2-cleft at the base, with the apex white. *Seed* oblong villous; pappus scarcely colored.
Yellow. ♃ August—Oct. Dry sandy soils. 1–2 ft

5. C. TRICHOPHYLLA. *Stem* hairy, erect. *Leaves* oblong, sessile, obtuse, lower ones attenuate at the base, woolly. *Flowers* in simple corymbs; invo-

lucre many leaved; leaflets narrow, glandular; florets of the ray narrow, long. *Seed* oblong, almost hispid; pappus colored.
Yellow. 4 August—Sept. Dry soils. 12–18 in.

6. C. Gossypina. *Stem* covered with a white woolly tomentum, hoary. *Leaves* oblong, spatulate, sessile, obtuse, entire. *Flowers* in simple corymbs; involucre many leaved, woolly, ray florets numerous. *Anthers* white at the summit. *Seed* viscid, the exterior pappus white, the interior brownish.
Yellow. 4 August—Oct. Pine lands middle Ga.

7. C. Dentata. *Stem* woolly. *Leaves* tomentose, cuneate, obovate, obtuse, deeply toothed, the lower ones with a long tapering base, obtusely toothed towards the apex, upper leaves entire, sessile, amplexicaule. *Flowers* in simple corymbs; involucre with subulate woolly leaves, ray florets numerous, nerved. *Seed* hispid, exterior pappus white, interior brown.
Yellow. 4 August—Oct. Middle Ga. 1–2 feet.

8. C. Divaricata. *Stem* erect, slender, hispid, scabrous, branching towards the summit. *Leaves* linear-lanceolate acute, ciliate, serrate, hispid, the lower ones attenuate at the base. *Flowers* in long divaricate panicles; involucre many leaved, scales pubescent on the back, linear-lanceolate. *Seed* hispid; pappus reddish brown, the exterior wanting.
Yellow. 4 August—Oct. Southern Georgia. 1-2-ft.

9. C. Scabra. *Stem* branching from the base, scabrous, divaricate, glandular, hairy. Radicle leaves oval, on petioles, dilated at the base, coarsely toothed, cauline ones cordate-ovate, acute, amplexicaule, all scabrous. *Flowers* in compound terminal panicles; involucre cylindrical; leaflets numerous, acute, linear, viscid; ray florets lanceolate nerved; exterior pappus a marginal ring, the interior wanting.
Yellow. 4 October. On the sea coast. 2–3 ft.

The following species are taken from the genus Aster.

10. C. Linariifolius. *Stem* erect, pubescent when young. *Leaves* numerous, linear, mucronate, scabrous, rigid. *Flowers* in umbellate corymbs with one at the extremity of each branch; involucre imbricate, scales numerous, linear-lanceolate, fringed, ray florets linear-lanceolate 3-cleft. *Seed* oblong, villous; pappus double consisting of long and short hairs.
Pale purple and yellow. 4 Sept.—Oct. Dry soils. Common.

11. C. Dichotomus. *Stem* pubescent, dichotomously divided towards the summit. *Leaves* sessile, oblong oval, obtuse, pubescent. *Flowers* in corymbs on long, naked peduncles; involucre with linear-lanceolate scales, pubescent, short. *Seeds* hairy; pappus double.
White, tinged with purple. 4 October. On the sea coast. 2 feet.

12. C. Humilis. *Stem* erect, pubescent. *Leaves* lanceolate, or somewhat rhomboidal, acuminate, glabrous, hispid along the margin and veins. *Flowers* in dichotomous corymbs; involucre with lanceolate hairy scales, ray florets generally 8. *Seeds* glabrous.
White. 4 Sept.—Oct. Mountains. 1–2 feet.

13. C. Amygdalinus. *Stem* striate, simple, branching, and finely pubescent towards the summit. *Leaves* lanceolate, acuminate, slightly pubescent, and scabrous on the upper surface. *Flowers* in terminal corymbs; involucre with short, lanceolate, pubescent scales; ray florets generally 12, narrow. *Seeds* pubescent.
White. 4 August—Sept. On the borders of swamps. Mid. Car. Ga. 2 ft.

14. C. Obovatus. *Stem* erect, pubescent, somewhat viscid when young, branching towards the summit. *Leaves* sessile oval, mucronate, tomentose beneath, somewhat rugose. *Flowers* in paniculate corymbs; involucre with short, appressed scales; ray florets 10–13, 3-toothed. *Seed* hispid.
White. 4 May—June. Damp soils. 2–3 ft.

Genus XXII. ECLIPTA.

Involucre many leaved, the leaves nearly equal, florets of

the disk perfect, 4-cleft, those of the ray pistillate; pappus wanting; receptacle bristly.

1. E. Erecta. *Stem* erect, strigose; dichotomous. *Leaves* opposite, lanceolate, serrate, or entire, attenuate at the base, 3 nerved, sessile. *Flowers* on long peduncles in pairs; involucre with ovate. acuminate leaves.
White. ☉ June—July. Gravelly soils.

2. E. Procumbens. *Stem* procumbent, assurgent, terete, with numerous opposite branches, with appressed hairs. *Leaves* sessile, opposite, lanceolate, narrowed at the base, 3-nerved; involucre with acute lanceolate leaves. *Flowers* on peduncles, generally in pairs; involucre with 8–10 leaves, lanceolate, ciliate, unequal; ray florets numerous, 2-toothed.
White. ☉ June—Oct. Damp soils. Common. 12–18 in.

3. E. Brachypoda. *Stem* prostrate, divaricately branched. *Leaves* lanceolate, slightly serrulate. *Flowers* on short peduncles, solitary or in pairs; involucre with oval lanceolate leaves; florets 4–5 cleft.
White. ☉ July—Sept. Sandy soils.

Genus XXIII. BUPHATHALMUM.

Involucre many leaved; florets of the disk 5-cleft, perfect, numerous, those of the ray pistillate. *Seeds* winged. *Pappus* 4-toothed, or an obsolete margin. *Receptacle* chaffy.

1. B. Frutescens. *Stem* erect, glabrous, branching, pubescent towards the summit. *Leaves* opposite, sessile, cuneate, lanceolate, glaucous, sparingly toothed at the base. *Flowers* solitary, terminal; involucre many leaved, imbricate. *Leaves* mucronate, expanding; ray florets lanceolate, 10–12. *Seeds* of the ray triangular; pappus 4-toothed; chaff pubescent, with a stiff point.
Yellow. ♄ or ♃ June—Oct. On the sea coast.

2. B. Angustifolium. *Stem* erect, branching. *Leaves* alternate, linear, entire, glabrous; involucre with acute, lanceolate leaves.
Yellow, ♄ or ♃ July—Sept. Southern Ga. and Florida.

Genus XXIV. GYMNOSTYLES.

Involucre many leaved. *Flowers* of the circumference sterile, of the center fertile; fertile florets apetalous. *Stamens* none; sterile florets with the corolla funnel shaped, slender. *Seeds* compressed. *Pappus* a winged margin, toothed. *Receptacle* naked.

1. G. Stolonifera. *Stem* glabrous, creeping. *Leaves* pinnatifid, with linear, and sometimes toothed segments, somewhat succulent, sprinkled with soft pubescence, tapering into a long base; all radicle. *Flowers* sessile at the root; involucre with oblong hairy leaflets, in a single series. *Seed* terminated by the persistent stile, enlarged at the summit.
♃ Feb.—May. Damp soils. Low country.

Genus XXV. ELEPHANTOPUS.

Involucre 4-flowered; florets all ligulate, perfect. *Pappus* bristly, consisting of 5 awns. *Receptacle* naked.

1. E. Carolinianus. *Stem* leafy, erect, terete, branching towards the summit, villous. *Leaves* oblong, attenuate at the base, hairy, slightly scabrous. *Flowers* in sessile, terminal clusters, with 3 unequal cordate bracts at the base of each capitulum; involucre 9–10 leaved, the interior longest, hairy

on the outside. *Corolla* ligulate at the summit, tubular towards the base, 4-cleft. *Seed* oblong.

Purple. 4 July—Sept. Common.

2. E. NYCTAGINEUS. *Stem* erect, branching towards the summit, scabrous, and hispid, usually purple, generally destitute of leaves. Radicle leaves large, oval-lanceolate serrate, scabrous on the upper surface, and villous beneath; bracts tomentose; involucre with rigid leaves.

Purple. 4 August—Sept, Common.

GENUS XXVI. CHRYSOCOMA.

Involucre imbricate, oblong, 8–10 leaved. *Corolla* tubular, with reflected segments; florets perfect. *Seeds* pubescent. *Pappus* pilose, scabrous. *Receptacle* naked.

1. C. NUDATA. *Stem* erect, glabrous, branching near the summit. Radicle leaves spatulate, lanceolate, acute, 3-nerved, entire, glabrous; cauline leaves with the upper ones small and linear. *Flowers* in a compound fastigiate corymb; involucre with appressed linear leaflets, colored, containing 3-4 flowers. *Style* about the length of the stamens, 2-cleft; pappus unequal.

Yellow. 4 Oct.—Nov. Common. 1-2 ft.

GENUS XXVII. ASTER.

Involucre imbricate, with the lower scales generally expanding, florets of the ray, usually more than 10, pistillate, never yellow; those of the disk hispid, receptacle naked, pappus simple, pilose.

(a.) *Florets of the ray* 5, *White. Scales of the involucre white with the summits green.*

1. A. SQUARROSUS. *Stem* glabrous, slightly angled. *Leaves* linear lanceolate sessile, entire, scabrous on the margin. *Flowers* sessile, in small clusters on corymbose, fastigiate branches: involucre cylindrical, with obtuse reflected scales. *Seeds* oblong, silky, pubescent, angled.

White. 4. July—September. Rich soils common.

2. A. CONCINNUS. *Stem* simple, striate, slightly pubescent, or somewhat rigid. *Leaves* sessile, the lower ones cuneate-lanceolate, serrate, ciliate, and scabrous above the margins, upper ones entire lanceolate. *Flowers* in sessile, clusters on fastigiate, corymbose branches: involucre, cylindrical, with oblong ciliate scales: ray florets, sometimes 6, 2-3-cleft at the summit. *Seeds* villous; pappus, scabrous.

White tinged with purple. 4. June—Aug. Mid. Upp dist. Car. & Ga.

3. A. TORTIFOLIUS. *Stem* pubescent, branching towards the summit.—*Leaves* sessile, serrulate, obovate, acute or obtuse, entire, pubescent. *Flowers* in sessile clusters on fastigiate, corymbose, branches, involucre cylindrical with appressed linear-lanceolate scales, ray florets 2-cleft. *Seeds* oblong, pubescent.

White. 4. Low country. 2-feet.

(b.) *Leaves entire, florets of the ray generally numerous. Seeds silky pubescent.*

4. A. HYSSOPIFOLIUS. *Stem* erect, glabrous, striate, with fastigiate branches. *Leaves* linear-lanceolate, 3-nerved, acute with scabrous margins. *Flowers* in terminal, fastigiate corymbs: involucre ovate, the interior scales obtuse, the exterior acute, florets of the ray from 3--10.

White tinged with purple. 4. Aug.—Oct. Com. Mid. Car. Ga. 1--2 ft.

5. A. PATENS. *Stem* procumbent, ascurgent, glabrous. *Leaves* subulate linear, sessile, 3-nerved, somewhat fleshy, very long. *Flowers* terminal on scattered branches, involucre with numerous linear-lanceolate scales,

tinged with purple; ray florets 3-toothed generally 20. *Seed* angled, oblong.
Pale purple. 4. September—October. On the Sea coast. 2--3 feet.

6. A. Paludosus. *Stem* pubescent near the summit. *Leaves* sessile subulate, acute, glabrous beneath, scabrous on the upper surface and margins, sometimes ciliate. *Flowers* solitary, large on naked peduncles; involucre squarrose, the lower scales leaf-like, reflexed, ray florets long, numerous.—*Seeds* glabrous, angled.
Purple. 4. October—November. Pine barrens, common.

7. A. Grandiflorus. *Stem* pubescent towards the summit. *Leaves* scabrous, linear sessile, rigid, reflexed, with the margin ciliate. *Flowers* solitary at the extremities of the branches; scales of the involucre linear-lanceolate, reflected; ray florets numerous, large. *Seeds* scarcely pubescent.
Purple. October----November. Sandy woods, common. 2--3 feet.

8. A. Exilis. *Stem* erect, slender, with corymbose branches. *Leaves* long, linear, slightly scabrous, diminishing in size towards the summit. *Flowers* on the upper branches in racemes, involucre, with glabrous, linear-lanceolate scales; ray florets numerous, narrow.
Purple. 4. September---October. Damp soils. 4--5 feet.

9. A. Subulatus. *Stem* erect, glabrous, much branched. *Leaves* long, linear, subulate, appressed. *Flowers* numerous, on terminal peduncles; involucre cylindrical, with the summit of the scales slightly reflexed; ray florets numerous, 3-cleft, short.
Purple. 4. September----October. Sea coast. 2--3 feet.

10. A. Foliolosus. *Stem* erect, branching, glabrous. *Leaves* sessile, linear-lanceolate, appressed, with scabrous margins, those of the branches minute, and numerous. *Flowers* in compound panicles; involucre with acute appressed scales, hairy, or ciliate at the summit; ray florets numerous, linear-lanceolate. *Seed* glabrous.
Purple. 4. September----October In dry soils, common. 2- 3 feet.

11. A. Sparsiflorus. *Stem* slender, erect, with expanding branches, glabrous. *Leaves* linear, reflexed, entire. *Flowers* solitary at the extremity of the branches; involucre, with acute, appressed scales.
Purple. 4. August----September. Low country. 2--3 feet.

12. A. Tenuifolius. *Stem* erect, glabrous near the base, branching. *Leaves* numerous, linear-lanceolate, tapering at each end, slightly scabrous along the margins, upper ones minute. *Flowers* in racemes on short peduncles; involucre with appressed linear acute scales; ray florets numerous, narrow.---- *Seed* oblong.
Purple. 4. Oct.----Nov. Mid. Upper dist. Carolina, Georgia.

13. A. Dumosus. *Stem* erect, glabrous, much less branched than the preceding species. *Leaves* linear-lanceolate, entire, with the margins slightly scabrous. *Flowers* solitary, terminal at the summit of the paniculate branches; involucre, with acute glabrous linear-lanceolate scales; ray florets numerous, narrow. *Seeds* scarcely pubescent.
Purple. 4. September---October. In damp rich soils. 1--2 feet.

14. A. Ericoides. *Stem* erect, slender, with numerous expanding branches. *Leaves* of the stem linear, glabrous, acute at each end, those of the branches subulate, numerous, very small. *Flowers* in racemes, on short peduncles; involucre with lanceolate scales; ray florets numerous, linear.
Purple. 4 Oct.—Nov. Barren soils. Common. 2–3 ft.

15. A. Racemosus. *Stem* diffuse, with slender, slightly pubescent branches. *Leaves* linear-lanceolate, with the margins scabrous, pubescent beneath, those of the branches very small. *Flowers* in simple racemes at the summit of the branches; involucre with linear lanceolate scales; ray florets, numerous, linear.
Purple. 4. Sept.—Oct. On the coast. 1–2 ft.

16. A. Multiflorus. *Stem* diffusely branched, almost hispid. *Leaves* linear, acute, pubescent, and fringed along the margin. *Flowers* in terminal racemes, somewhat secund; involucre with ciliate, obovate scales, squarrose.

Almost white. 4 August—Sept. In open fields. Common. 2–3 ft.

17. A. Squarrosus. *Stem* procumbent, branching, hispid, hairy. *Leaves* small, numerous, ovate, reflexed, hispid along the margin, scabrous. *Flowers* terminal in a loose panicle; involucre with lanceolate hairy scales; ray florets numerous, 3-toothed, rather large.

Blue. 4 Sept.—Oct. Dry soils. Common. 2–3 ft.

18. A. Concolor. *Stem* erect, pubescent, sparingly branched towards the summit. *Leaves* pubescent, almost tomentose, oblong lanceolate. *Flowers* in terminal racemes; involucre, with lanceolate silky scales; ray florets linear lanceolate.

Blue. 4 Sept.—Oct. Dry soils. common. 2–3 ft.

19. A. Reflexifolius. *Stem* erect, tomentose, branching towards the summit. *Leaves* sessile, oblong-lanceolate, acute, margins revolute, tomentose, 3-nerved. *Flowers* in racemes; involucre with acute scales.

White 4. August—Oct. Car. and Ga. 2–3 ft.

20. A. Novæ Angliæ. *Stem* erect, with diffuse, spreading branches, hairy. *Leaves* narrow, lanceolate, amplexicaule, auriculate at the base, hairy, and scabrous along the margin. *Flowers* in terminal panicles; involucre with lanceolate scales, somewhat hispid, ray florets numerous, narrow.

Purple. 4 Sept.—Oct. Western Ga. 4–10 feet.

21. A. Cyaneus. *Stem* glabrous, young branches slightly pubescent, expanding. *Leaves* linear-lanceolate, somewhat scabrous, slightly amplexicaule. *Flowers* in paniculate racemes; involucre with appressed linear-lanceolate scales; ray florets numerous, narrow. *Seed* pubescent.

Purple. 4 Sept.—Oct. Middle Car. and Ga, 3–4 ft.

22. A. Virgatus. *Stem* erect, glabrous, with long erect virgate branches, slightly pubescent at the summit. *Leaves* linear-lanceolate, amplexicaule, long, glabrous, margins slightly scabrous. *Flowers* in terminal racemes; involucre with the scale slightly squarrose, slightly mucronate, ray florets small. *Seeds* scarcely pubescent.

Purple. 4 Sept.—Oct. Middle Ga. 3–4 ft.

23. A. Carolinianus. *Stem* shrubby, flexuous and decumbent, much branched, pubescent. *Leaves* oblong lanceolate, sessile, attenuate at each end, pubescent, ciliated and amplexicaule at the stem. *Flowers* large, numerous, solitary, on short peduncles; involucre with pubescent scales; ray florets numerous.

Purple. ½ Oct.—Nov. In swamps. 8–12 ft.

(*c*) *Leaves serrate. Flowers in corymbs.*

24. A. Superbiens. *Stem* erect, simple, pubescent towards the summit. *Leaves* sessile, obovate lanceolate, pubescent on the under surface, scabrous above, ciliate when young, slightly serrate, upper leaves generally entire. *Flowers* large, in terminal corymbs; involucre with oblong, ovate, pubescent scales, reflexed; ray florets numerous, large. *Seeds* pubescent.

Purple. 4 Oct.—Nov. Car. and Ga. 12–28 in.

25. A. Puniceus. *Stem* erect, glabrous, shining, branches striate, pubescent. *Leaves* spatulate, sessile, clasping, serrate, scabrous on the upper surface, large. *Flowers* in corymbose panicles, large; involucre with ciliate, linear reflexed scales; ray florets numerous, linear-lanceolate.

Purple. 4 Oct.—Nov. On the banks of rivers in So. Ga. 2–3 ft.

26. A. Dracunculoides. *Stem* erect, with corymbose branches marked with a hairy line. *Leaves* linear, or linear-lanceolate, acuminate, serrate in the middle, upper ones entire. *Flowers* small, in corymbs; involucre with lanceolate expanding scales.

Nearly white. 4 Sept.—Nov. In low grounds. Upper Car.

(*d*) *Leaves serrate. Flowers in panicles.*

27. A. Junceus. *Stem* erect, with long, slender branches, slightly pubescent. *Leaves* sessile, linear-lanceolate, serrate, glabrous, upper ones entire.

Flowers in racemes; involucre with linear-lanceolate scales, nearly glabrous; ray florets small, narrow.

Purple. 4. Sept.—Oct Damp soils. 2--4 feet.

28. A. Divergens. *Stem* erect, pubescent towards the summit, branching. *Leaves* broad-lanceolate, serrate, glabrous, upper ones entire. *Flowers* in crowded racemes; involucre with linear-lanceolate, glabrous scales.

White, tinged with purple. 4. Sept.—Oct. Common. 3- 4 feet.

29. A. Tradescanti. *Stem* erect, glabrous, with numerous, virgate branches. *Leaves* lanceolate, serrate, attenuate at each end, upper ones small, entire. *Flowers* numerous, in compound racemes; involucre with linear-lanceolate scales; ray florets numerous, narrow.

Purple. 4. Sept.—Oct, Near the mountains. 3–4 feet.

30. A. Discoidees. *Stem* erect, usually villous, with few erect, virgate branches. *Leaves* spatulate, coarsely serrate, acute, pubescent. *Flowers* in long, virgate panicles; involucre with villous, subulate scales; ray florets wanting, those of the disk deeply 5-cleft, 12--15. *Seed* glabrous.

Purple. 4. Sept.—Oct. In rich, high lands, northern Ga. 3–4 feet.

31. A. Versicolor. *Stem* erect, branching, glabrous. *Leaves* broad, lanceolate, amplexicaule, glabrous, serrate in the middle, upper ones entire. *Flowers* clustered towards the summit of the branches; involucre with loose, lanceolate scales.

White or purple. September—October. In damp soils. 2--3 feet.

32. A. Lævigatus. *Stem* glabrous, much branched. *Leaves* broad, lanceolate, glabrous, slightly serrate, somewhat amplexicaule, the upper ones narrower and entire. *Flowers* in racemose panicles; involucre with linear-lanceolate scales; ray florets numerous, linear. *Seed* pubescent.

Purple. 4. Sept.—Oct. Damp rich soils. 2--4 feet.

33. A. Amplexicaulis. *Stem* erect, glabrous, somewhat branched. *Leaves* oblong, lanceolate, acute, amplexicaule, cordate, serrate, glabrous, the lower more attenuate and less cordate at the base. *Flowers* in terminal panicles; involucre with thick, glabrous, lanceolate scales; ray florets numerous, narrow. *Seed* nearly glabrous.

Purple. 4. Sept.—Oct. In dry soils. 2--3 feet.

(e.) *Leaves cordate, serrate.*

34. A. Undulatus. *Stem* erect, scabrous, branching. *Leaves* oblong, cordate, amplexicaule, scabrous, somewhat undulate, dentate near the summit. *Flowers* in loose, terminal panicles; involucre with pubescent, linear-lanceolate scales; ray florets numerous. *Seeds* hairy.

Purple. 4. Sept.—Oct. In dry soils. 2--3 feet.

35. A. Diversifolius. *Stem* erect, pubescent, scabrous, much branched towards the summit. *Leaves* entire or slightly toothed, petioles of the lower leaves winged, amplexicaule, those of the branches small, pubescent underneath, scabrous above. *Flowers* in terminal panicles; involucre with numerous, ciliate, pubescent scales. *Seeds* slightly angled, hairy.

Purple. 4. Sept.—Oct. Common. 2–3 feet.

36. A. Sagittifolius. *Stem* erect, glabrous, much branched. Radicle leaves oblong-lanceolate, cordate and sagittate at the base, unequally serrate, glabrous, petiolate; cauline leaves acuminate, on winged petioles, upper ones oblong, lanceolate, sessile. *Flowers* in racemes; peduncles leafy, involucre with lanceolate scales.

Purple. 4. Sept.—Oct. Upper district Carolina. 2--3 feet.

37. A. Scaber. *Stem* erect, striate, scabrous, somewhat hairy. *Radicle* leaves on long petioles, cordate, with round lobes, acute at the apex; cauline leaves ovate-lanceolate, or linear-lanceolate, attenuate at the apex, rigid, scabrous *Flowers* in long, terminal panicles; involucre with acute, appressed scales, pubescent; ray florets oval, numerous. *Seed* angled, hairy.

Purple. 4. Sept.—Oct. In dry soils. 2--3 feet.

38. A. Paniculatus. *Stem* erect, striate, glabrous, much branched, young

branches pubescent. *Leaves* ovate-lanceolate, acute, slightly pubescent along the margins and veins, petiolate. *Flowers* in compact, racemose panicles; involucre with numerous, subulate scales; ray florets narrow, about 12. *Seeds* glabrous.

Purple. 4. Sept.—Oct. In rich soils. 3-4 feet.

39. A. Cordifolius. *Stem* erect, with pubescent branches. Radicle leaves cordate, attenuate at the apex, serrate, on slightly winged petioles, pubescent beneath. *Flowers* in racemose panicles, numerous; involucre with linear-lanceolate scales, slightly appressed, ray florets narrow, about 12. *Seed* glabrous.

White, tinged with purple. 4. Sept.—Nov. Upper dis. Car. Ga.

40. A. Corymbosus. *Stem* erect, glabrous, with slightly pubescent branches. *Leaves* ovate, cordate, the upper spatulate, lanceolate, glabrous, acutely serrate. *Flowers* in fastigiate corymbs; involucre with pubescent, ovate-lanceolate scales; ray florets narrow, about 12. *Seeds* glabrous.

White, tinged with purple. 4. Sept.—Oct. Upper dis. Car. Ga. 2-3 ft.

Genus XXVIII. SOLIDAGO.

Involucre imbricate, with appressed scales; florets of the ray usually 5, pistillate, those of the disk perfect; receptacle naked, punctate. *Pappus* pilose, simple.

1. S. Canadensis. *Stem* erect, villous. *Leaves* lanceolate, serrate, 3-nerved, scabrous on the upper surface, pubescent beneath. *Flowers* in long, recurved racemes, secund; involucre with 12-16 oblong, appressed scales; ray florets very short. *Golden rod.*

Yellow. 4. Sept.—Oct. Mountains of Carolina.

2. S. Procera. *Stem* erect, villous. *Leaves* lanceolate, 3-nerved, acute at each end, finely serrate, scabrous on the upper surface, finely villous beneath. *Flowers* in erect racemes, panniculate; involucre with linear-lanceolate scales; ray florets small.

Yellow. 4. Sept.—Oct. Middle Georgia. 3-5 feet.

3. S. Reflexa. *Stem* erect, villous. *Leaves* narrow, lanceolate, serrate in the middle, 3-nerved, scabrous, reflexed. *Flowers* in paniculate, reflexed racemes.

Yellow. 4. Aug.—Sept. Pine woods, common. 2-3 feet.

4. S. Latissimifolia. *Stem* erect, somewhat hairy, branching. *Leaves* lanceolate, smooth, broad, scabrous on the margin, lower ones slightly serrate. *Flowers* in paniculate racemes; racemes recurved, secund.

Yellow. 4. Aug.—Oct. Dry woods, common. 2-3 feet.

5. S. Rugosa. *Stem* erect, hispid, branching towards the summit, lower leaves sessile, lanceolate, serrate, scabrous, hairy underneath; upper leaves ovate, sparingly serrate. *Flowers* in expanding, paniculate racemes; racemes secund, recurved; involucre with linear, lanceolate scales; ray florets small.

Yellow. 4. Sept.—Oct. Rich soils. Variable in its characters. 3-7 ft.

6. S. Asperula. *Stem* erect, hairy, terete, slightly scabrous. *Leaves* sessile, ovate-lanceolate, or somewhat elliptic, scabrous on the upper surface, hairy beneath, serrate. *Flowers* in paniculate, recurved racemes; involucre with linear-lanceolate scales; ray florets small.

Yellow. 4. Sept.—Oct. Middle Car. Ga. 3-5 feet.

7. S. Altissima. *Stem* erect, hispid, stout, much branched at the summit. *Leaves* lanceolate, sessile, acute, lower ones deeply serrate, very scabrous, rugose. *Flowers* in large, paniculate racemes; racemes recurved. Perhaps a variety of the rugosa.

Yellow. 4. August—Sept. Common. 3-7 feet.

8. S. Villosa. *Stem* erect, villous, with many recurved branches near the

summit. *Leaves* sessile, the lower ones oblong-lanceolate, serrulate, with a few hairs along the veins, the upper ones entire, ovate-lanceolate, with several small leaves in the axils. *Flowers* in a terminal panicle; racemes recurved, secund; involucre with linear scales; ray florets small.

Yellow 4. September—Oct. Common. 3-5 feet.

9. S. NEMORALIS. *Stem* erect, tomentose, sparingly branched. *Leaves* lanceolate, alternate at the base of the stem, slightly hispid, with axillary clusters of small leaves, those of the root serrate, somewhat cuneate. *Flowers* in paniculate racemes, secund; involucre with linear-lanceolate scales, pubescent along the margins.

Yellow. 4. Sept.—Oct. In dry soils, common. 2-3 feet.

10. S. ULMIFOLIA. *Stem* erect, villous when young, tomentose, striate, with numerous recurved branches; cauline leaves oblong-lanceolate, serrate, acute, scabrous on the upper surface, hairy beneath. *Flowers* in paniculate racemes; racemes secund and recurved; involucre with narrow, oblong scales; ray florets short. *Seed* pubescent.

Yellow. 4. Sept.—Oct. In rich soils.

11. S. ARGUTA. *Stem* erect, glabrous, striate, with long virgate branches. *Radicle* leaves spatulate, acutely serrate, with a long attenuated base; cauline leaves eliptic, serrate. those of the branches entire, 3-nerved. *Flowers* in long paniculate racemes; involucre with linear-lanceolate scales.

Yellow. 4. September. Shaded soils.

12. S. CINERASCENS. *Stem* erect, pubescent, slender. with numerous slender expanding branches towards the summit. *Leaves* long linear-lanceolate; radicle ones, with a long tapering base, slightly serrate; cauline ones, small, and scattered towards the summit. *Flowers* in paniculate racemes, racemes secund, with the pedicels often 3-flowered.

Yellow. 4. September—October. Middle Georgia.

13. S. JUNCEA. *Stem* erect, slender, glabrous, branches pubescent when young. *Leaves* long-lanceolate, glabrous, with scabrous margins the lower ones serrate, obscurely 3-veined. *Flowers* in loose terminal, paniculate racemes; racemes secund, recurved; involucre with oval, slightly pubescent scales.

Yellow. 4. Sept.—Oct. Upper districts of Carolina, Georgia.

14. S. ELLIPTICA. *Stem* erect, glabrous, with numerous recurved, branches towards the summit. *Leaves* oval-lanceolate, or elliptic, serrate, glabrous, with scabrous margins, *Flowers* in paniculate racemes; racemes secund, expanding, leafy, involucre, with acute linear-scales, glabrous.

Yellow. 4. Sept.—Oct. In rich soils. Low country.

15. S. ODORA. *Stem* erect, pubescent towards the summit, branching.—*Leaves* sessile, linear-lanceolate, glabrous, entire, with scabrous margins.—*Flowers* in paniculate racemes; racemes recurved, involucre, with linear-lanceolate scales.

Yellow. 4. September—October. Mountains.

16. S. RETRORSA. *Stem* erect, glabrous or pubescent towards the summit. *Leaves* linear, sessile, tapering at the summit, glabrous, reflexed, scabrous along the margin. *Flowers* in paniculate racemes; racemes recurved; involucre with ciliate, lanceolate scales, ray florets 3, of the disk 3-4.

Yellow. 4. August—October. Very Common.

17. S. TORTIFOLIA. *Stem* erect, pubescent towards the summit. *Leaves* linear-lanceolate, slightly serrate, obscurely 3-veined, usually twisted. *Flowers* in compact paniculate racemes recurved; involucre, with linear-lanceolate scales, ray florets 3-5.

Yellow. 4. August—October. Very Common. 2-3 feet.

18. S. PYRAMIDATA. *Stem* erect, terete, hispid. *Leaves* oblong, ovate, margin serrulate, scabrous, somewhat amplexicaule, midrib pubescent. *Flowers* in paniculate filiform racemes; racemes secund, recurved, pubescent. *Corolla* small, ligulate. minute. *Seed* smooth.

Yellow. 4. August—September. Pine barrens. 4-6 feet.

19. S. Corymbosa. *Stem* erect, branching near the summit, glabrous, with the young branches hirsute *Radicle* leaves long, indented along the margin, oblong-lanceolate, somewhat fleshy, the upper entire, ciliate along the margin. *Flowers* in corymbose racemes, lower branches recurved; involucre with pubescent ciliate scales; ray florets 10. *Seed* glabrous.
Yellow. 4. September—October. Middle Georgia. 4–6 feet.

20. S. Semperviriens. *Stem* erect, glabrous, with recurved branches towards the summit. *Leaves* linear-lanceolate, long, acute, scabrous along the margin, entire. *Flowers* in axillary racemes, small; involucre with linear-lanceolate scales; ray florets generally 5.
Yellow. 4. Sept.—Oct. In rich soils, Common. 3–6 feet.

(b.) Racemes erect.

21. S. Limonifolia. *Stem* oblique, glabrous, usually colored. *Leaves* sessile, lanceolate, somewhat fleshy, entire, glabrous. *Flowers* in erect paniculate racemes; involucre with linear, acute scales; ray florets 7–10. *Seed* pubescent.
Yellow. 4 August—October. On the sea coast. 3–5 feet.

22. S. Speciosa. *Stem* erect, slightly furrowed, glabrous, with virgate branches pubescent when young. *Leaves* broad-lanceolate, coriaceous, upper ones entire, the lower slightly serrate. *Flowers* in numerous erect racemes; involucre with oblong, obtuse scales; ray florets 5. *Seed* glabrous.
Yellow. 4. September—October. Middle Georgia. 3–8 feet.

23. S. Pubescens *Stem* erect, pubescent, with numerous erect branches. *Leaves* long, lanceolate, the upper ones generally entire, pubescent, the lower serrate, slightly scabrous, spatulate. *Flowers* in paniculate racemes: involucre with pubescent subulate scales; ray florets 7–10. *Seeds* pubescent.
Yellow. 4 October. Damp soils. Middle Ga. 3–5 ft.

24. S. Paucifloscutosa. *Stem* erect, somewhat shrubby, glabrous. *Leaves* lanceolate, obtuse. *Flowers* in compound panicles; involucre oblong, 5-flowered; ray floret 1.
Yellow. 4 August—Oct. In pine barrens.

25. S. Bicolor. *Stem* erect, pubescent. *Leaves* oblong-lanceolate, the lower ones serrate, attenuate at the base, pubescent. *Flowers* in compact racemes; involucre with obtuse linear-lanceolate scales; ray florets 5–8.
Nearly white. 4 Sept.—Oct. Dry pastures. 2–3 ft.

26. Petiolaris. *Stem* erect, striate, villous. *Leaves* oval-lanceolate, pubescent, upper ones nearly sessile, the lower, attenuate with a sheathlike petiole, serrate. *Flowers* in long, terminal racemes; involucre with oblong pubescent scales; ray florets 6–8. *Seed* glabrous.
Yellow 4 August—Sept. Mountains. 2–3 ft.

27. S. Stricta. *Stem* erect, glabrous. *Leaves* lanceolate, entire, glabrous, with scabrous margins. Radicle ones serrate. *Flowers* in erect paniculate racemes.
Yellow. 4 August—Sept. In sandy woods. 2 ft.

28. S. Virgata. *Stem* erect, striate, slender towards the summit, nearly glabrous. Radicle leaves very long, spatulate-lanceolate; cauline ones diminishing towards the summit, oblong-lanceolate, somewhat fleshy, scabrous along the margins, appressed; involucre with linear-lanceolate pubescent scales; ray florets 5–7. *Seed* hairy.
Yellow. 4 June—Oct. Damp soils. 2–4 ft.

29. S. Pulverulenta. *Stem* erect, slender towards the summit, reddish, covered with a pulverulent pubescence. *Leaves* sessile, the lower ones acute, serrate, elliptic, the upper entire, with scabrous margins obovate. *Flowers* in erect racemes; ray florets long.
Yellow. 4 August—Sept. Low country. 3–4 ft.

30. S. Erecta. *Stem* erect, simple, somewhat pubescent towards the summit. *Leaves* lanceolate, glabrous, acute at each end, the lower ones some-

what petiolate. *Flowers* in short, erect, axillary and terminal racemes; involucre with linear scales; ray florets 7–10. *Seed* glabrous.
Pale yellow. 4. Sept—Oct. Damp soils. 2–3 feet.

31. S. Cœsia. *Stem* erect, glabrous, with numerous, slender, expanding branches, slightly tinged with purple. *Leaves* sessile, lanceolate, acuminate, finely serrate, with the margins slightly scabrous. *Flowers* in erect racemes; involucre with linear scales; ray florets generally 5. *Seed* nearly glabrous.
Yellow. 4. Sept.—Oct. Upper districts of Car. Ga. 2–3 feet.

32. S. Lithospermifolia. *Stem* erect, branching, pubescent. *Leaves* lanceolate, scabrous on both surfaces, tapering, 3 veined, entire. *Flowers* in erect racemes; ray florets long.
Yellow. 4 August—Oct. Sandy, barren soils. 2–3 feet.

33. S. Flexicaulis. *Stem* slender, flexuous, glabrous. angled. *Leaves* ovate-lanceolate, acuminate, serrate, glabrous, attenuate at the base. *Flowers* in erect, axillary racemes; involucre with linear scales; ray florets generally 5, disk 7–8. *Seed* hairy.
Yellow. 4 Sept.—Oct. Upper district Car. Ga. 2–3 feet.

34. S. Glomerata. *Stem* simple, small *Leaves* glabrous, oblong-lanceolate, serrate, lower ones broad, acuminate. *Flowers* in simple racemes, composed of axillary heads, the upper ones clustered; involucre swollen, many flowered.
Yellow. 4 August.—Sept. Mountains.

35 S. Squarrosa. *Stem* erect, pubescent, striate, branching. *Leaves* lanceolate, acute, serrate towards the apex, pubescent beneath, the lower ones tapering at the base into a petiole. *Flowers* in compound, erect racemes, large; involucre with reflexed, linear scales; ray florets generally 10, the disk numerous. *Seed* glabrous.
Yellow. 4 Sept.—Oct. Sandy soils. 3–5 feet.

36. S. Angustifolia. *Stem* erect, glabrous, with numerous erect branches, generally colored. *Leaves* sessile, subulate entire, nearly linear, somewhat scabrous along the margins, sometimes with axillary clusters of setaceous leaves. *Flowers* in erect paniculate racemes; involucre with glabrous linear-lanceolate scales; ray florets 7–10.
Yellow. 4. Sept.—Oct. Rich soils. On the sea coast. 2–3 feet.

37. S. Salicina. *Stem* erect, slender, pubescent when young, nearly glabrous when old, with long erect virgate branches. *Leaves* sessile, the lower ones long, narrow-lanceolate, scabrous on the upper surface, glabrous on the under, upper leaves smaller. *Flowers* in long slender racemes; involucre with oblong scales; ray florets slender, generally 5.
Yellow. 4. September—October. Middle Georgia. 4–5 feet.

38. S. Elata. *Stem* erect, terete, pubescent, with erect tomentose branches. *Leaves* sessile, oval-lanceolate, acute, tomentose beneath, nearly entire.—*Flowers* in erect paniculate racemes, involucre with pubescent, linear-lanceolate scales; ray florets 7–10. *Seed* glabrous.
Yellow. 4. September—October. Middle Georgia. 2–3 feet.

39. S. Rigida. *Stem* erect, slightly angled, tomentose, when young branches numerous, fastigiate. *Leaves* ovate, sessile, pubescent, scabrous, upper ones entire, the lower serrate. *Flowers* clustered near the summit of the branches, large; involucre with oblong pubescent scales; ray florets 7–10, those of the disk, numerous. *Seed* glabrous.
Yellow. 4. September—October. Mountains. 3–4 feet.

40. S. Graminifolia. *Stem* angled, slightly furrowed, branches numerous, expanding, angles pubescent. *Leaves* linear, numerous, obscurely veined, pubescent along the veins on the under surface. *Flowers* in fastigiate, terminal corymbs; involucre with numerous, viscid linear-lanceolate scales; ray florets 10, short. *Seeds* villous.
Yellow. 4. September—October. Damp rich soils. 2–3 feet.

41. S. Tenuifolia. *Stem* erect, angled, scabrous, with fastigiate branches. *Leaves* linear, expanding, obscurely veined, scabrous, clusters of small

leaves in the axils. *Flowers* in fastigiate terminal corymbs; involucre with viscid scales; ray florets, about 10, very short. *Seed* villous.
Yellow. 4 Sept.—Oct. In dry pastures very common. 3–4 ft.

Genus 29. ERIGERON.

Involucre imbricate; ray florets pistillate, numerous, narrow, those of the disk perfect, linear. *Pappus* double, the outer series very small, the inner pilose. *Receptacle* naked.

1. E. Neglectum. *Stem* erect, pubescent and scabrous near the summit. Radicle leaves spatulate-lanceolate, acute, irregularly toothed, glabrous; cauline ones smaller, ciliate near the base. *Flowers* in small terminal corymbs; involucre with acute subulate leaves, pubescent near the base; ray florets numerous, somewhat 3-toothed at the summit; disk florets numerous, greenish yellow, 5-toothed. *Seed* hispid. *Receptacle* flat, dotted.
White. 4 Through the Summer. Common. 1–2 ft.

2. E. Bellidifolium. *Stem* hirsute, very hairy. Radicle leaves obovate, slightly serrate; cauline leaves sessile, scattered, oblong lanceolate, the lower ones similar to the radicle. *Flowers* 3–5, terminal, central one the largest; involucre the leaves in a double series, linear-lanceolate; ray florets linear; disk florets yellowish. *Seed* compressed, nearly glabrous. *Receptacle* somewhat convex, dotted. *Robin's plantain.*
Pale blue. 4 March—April. Common. 1–2 ft.

3. E. Strigosum. *Stem* pubescent, slightly scabrous. Radicle leaves linear-lanceolate, denticulate; cauline ones long, linear, entire. *Flowers* in a terminal panicle; involucre with subulate leaves, pubescent; ray florets 2–3 cleft at the summit. *Seeds* hispid; exterior pappus minute scales, interior wanting, or a few pilose rays; disk florets yellow.
White. 4 May—Aug. Common in sandy pastures. 2–3 ft.

4. E. Amblyum. *Stem* erect pubescent, somewhat scabrous. *Leaves* linear, lower ones serrulate. *Flowers* usually in pairs, axillary and terminal; involucre hemispherical.
Yellow. 4 July—Aug. Middle Ga. 1–2 ft.

5. E. Philadelphicum. *Stem* pubescent, slightly furrowed. Radicle leaves cuneate, obovate, sometimes incisely toothed; cauline leaves oblong-lanceolate, amplexicaule entire. *Flowers* in loose corymbs; ray florets capillary, numerous; involucre many leaved, with the leaves arranged in two series, subulate.
White, or pale purple. 4 Feb.—June. Common. 1–2 ft.

6. E. Quercifolium. *Stem* pubescent. Radicle leaves lyrate, and coarsely toothed; cauline ones entire. *Flowers* few, terminal; ray florets numerous; involucre with numerous subulate leaves.
Pale blue, or white. 4 July—Aug. Middle Car. 8–12 in.

7. E. Canadense. *Stem* hispid, paniculately branched. *Leaves* linear-lanceolate, narrow, ciliate. *Flowers* in racemose panicles; involucre cylindrical, with acute linear leaves; ray florets numerous, short capillary; disk florets 4-cleft. *Seeds* somewhat hairy; pappus simple, pilose.
White. ☉ June—Sept. Common. 1–8 ft.

8. E. Pusillum. *Stem*, glabrous, slender. *Leaves* linear-lanceolate, entire with scabrous margins. *Flowers* in simple panicles, with divaricate branches; involucre with narrow, acute leaves; ray florets numerous, capillary; pappus simple.
White. ☉ July—Sept. Common. 6–8 in.

Remarks.—The two preceding species we think ought certainly to constitute a distinct genus, and we might add several varieties of these, differing from each other in a greater or less degree, but we must content ourselves for the present, till the obtaining of more extensive materials shall enable us to do it more satisfactorily.

Genus XXX. BOLTONIA.

Involucre imbricate; ray florets numerous, pistillate; those of the disk perfect. *Receptacle* conic, dotted. *Seeds* flat, margined. *Pappus* awned, with two opposite ones larger than the rest.

1. B. Asteroides *Stem* erect, somewhat striate, glabrous. *Leaves* alternate, sessile, entire, lanceolate, glabrous, with scabrous margins. *Flowers* in panicles, on long peduncles; involucre with subulate scales; ray florets entire, linear; those of the disk yellow. *Seeds* compressed.

White or reddish. ♃ August—Sept. On the margins of swamps. Middle Car. and Ga. 1-2 ft

2. B. Glastifolia. *Stem* erect, branching, slightly angled, glabrous. *Leaves* long-lanceolate, serrate, acute, with cartilaginous margins; lower ones somewhat toothed. *Flowers* solitary, on short peduncles; involucre with glabrous, subulate leaves, with the margins slightly serrulate; ray florets numerous, those of the disk numerous, yellow. *Seeds* pubescent, winged, obcordate; pappus consisting of scabrous bristles, unequal.

White, or reddish. ♃ July—Aug. Middle and Southern Ga. 2-3 ft.

(c) Eupatorineæ. The Boneset Tribe.

Genus XXXI. KUHNIA.

Involucre cylindrical, imbricate; florets all perfect, tubular. *Pappus* plumose, sessile. *Seed* pubescent, striate.

1. K. Eupatorioides. *Stem* glabrous, branching, the young branches very pubescent. *Leaves* broad-lanceolate, irregularly serrate, petiolate, slightly scabrous on the upper surface, pubescent beneath, spotted. *Flowers* in panicles, terminal; involucre about 10-flowered, with linear, pubescent leaves, the outer ones small. *Seeds* pubescent.

White. ♃ Sept.—Oct. Middle and Western Ga. and Ala. 2-3 ft.

2. K. Critonia. *Stem* pubescent, slender, striate. *Leaves* lanceolate, or linear, petiolate, entire, with the margin revolute when young, dotted beneath. *Flowers* in terminal divaricate panicles; involucre imbricate, with 8–10 flowers. *Leaves* linear, pubescent, outer ones reflexed at the summit. *Seed* cylindrical; pappus of numerous plumose rays.

White. ♃ Sept.—Oct. In dry soils. Common. 2-3 ft.

Genus XXXII. MIKANIA.

Involucre 4–6.leaved, equal, with 4–6 florets. *Receptacle* naked; florets all perfect, tubular. *Style* long, deeply cleft. *Pappus* pilose.

1. M. Scandens. *Stem* twining, glabrous, *Leaves* cordate, acuminate, repand toothed, with unequal divaricate lobes. *Flowers* in axillary corymbs. *Climbing Thoroughwort.*

Bluish White. ♃ July—Sept. Margins of rivulets. Common. 10–15 ft.

2. M. Pubescens. *Stem* twining pubescent; striate. *Leaves* cordate, acuminate, angularly toothed, somewhat hastate at the base. *Flowers* in axillary, and terminal, paniculate corymbs; involucre, 5-leaved, one smaller than the rest, hairy. *Flowers* fragrant. *Seed* oblong, striate. *Receptacle* dotted.

Pale purple. ♃. July—August. Common. 15–20 feet.

Genus XXXIII. EUPATORIUM.

Involucre imbricate, oblong, florets all perfect, tubular.—*Style* long, deeply cleft. *Receptacle* naked. *Seed* glabrous, 5-striate or angled. *Pappus* plumose, usually scabrous.

(*a.*) *Involucre, 3–5-flowered.*

1. E. Fœniculaceum. *Stem* striate, finely pubescent, with paniculate branches, lower leaves compoundly pinnate, with filiform segments, glabrous, furrowed on the upper surface, the upper ones setaceous, in cluster. *Flowers* in compound erect, panicles, very small, and very numerous; involucre, with 5 interior equal leaves, and 5 small exterior ones, all pubescent. *Seeds* cylindrical; receptacle naked.

Yellowish white. ♃. Sept.—Oct. Very abundant. 3–10 feet.

2. E. Connatifolium. *Stem* erect, pubescent, paniculately branched, lower leaves pinnatifid, with 5–7 linear-lanceolate, segments, denticulate, upper leaves linear, clustered, all pubescent. *Flowers* in compound panicles; involucre, with 8–10 unequal pubescent leaves. *Seed* glabrous, pappus scabrous.

White. ♃. Sept.—Oct. Poor soils. Common. 3–4 feet.

3. E. Perfoliatum. *Stem* erect, striate, glabrous, branching with the branches pubescent, lower leaves pinnatifid, verticillate, with linear segments, pubescent, upper leaves generally alternate. *Flowers* in fastigiate corymbs; involucre, 8–10 leaved, with glandular dots on the back. *Seed* oblong, deeply striate, puppus, scabrous.

White. ♃. September—October. Damp soils. 3–4 feet.

4. E. Linearifolium. *Stem* usually procumbent, very pubescent towards the summit, branching. *Leaves* sessile, pubescent, linear-lanceolate, with clusters of small leaves at the axil. *Flowers* in irregular corymbs; involucre with 10 linear villous leaves, glandular on the outer surface. *Seed* deeply striate, pappus, scabrous.

White. ♃. Aug.—Sept. Dry soils. Common. 1–2 feet.

5. E. Hyssopifolium. *Stem* erect, pubescent. *Leaves* sessile, the lower ones linear lanceolate, opposite: somewhat toothed, upper ones alternate pubescent, with clusters of small leaves in the axils. *Flowers* in terminal corymbs; involucre, 10 leaved, sprinkled with glandular dots, purplish at the summit.—*Seed* furrowed, glandular, pappus, scabrous.

White. ♃. September—October. Very common. 2–3 feet.

6. E. Glaucescens. *Stem* erect, pubescent. *Leaves* broad-lanceolate, slightly serrate toward the summit, 3 nerved, pubescent, with a pair of small leaves in the axil. *Leaves* of the branches usually alternate, small, glaucous. *Flowers* in corymbs; involucre with 8–10 lanceolate leaves, pappus, scabrous.

White. ♃. Aug.—Sept. Rich soils. Md. & Upp. Car. & Ga. 2-3 ft.

7. E. Sessilifolium. *Stem* somewhat angled. *Leaves* sessile, amplexicaule, rounded at the base, dotted beneath, opposite serrate. *Flowers* in terminal corymbs; peduncles pubescent.

White. ♃. August—September. Mountains. 2–3 feet.

8. E. Truncatum. *Stem* erect, pubescent, particularly towards the summit. *Leaves* sessile, amplexicaule, lanceolate serrate; glabrous on the upper surface, pubescent along the veins, beneath dotted, truncate at the base, involucre, pubescent.

White. ♃. August—September. Mountains. 2–3 feet.

9. E. Album. *Stem* erect, striate, villous, lower leaves opposite, the upper alternate all pubescent, coarsely toothed, sessile, lanceolate. *Flowers* in fastigiate corymbs; involucre, 10 leaved, the 5 interior long, white with glandular dots. *Seed* furrowed, pappus scabrous.

White. ♃. Aug.—Sept. Poor soils, common. 2–3 feet.

10. E. Parviflorum. *Stem* erect, pubescent. *Leaves* sessile, lower ones

opposite, upper ones alternate, lanceolate, serrate, towards the apex, entire and alternate at the base. *Flowers* in terminal corymbs; involucre with the interior leaves ligulate, the exterior small, all pubescent, dotted. *Seeds* angled:
White. 4. September—October. Southern Georgia. 1–2 feet.

11. E. Scabridum. *Stem* pubescent, with the lower branches brachiate, the upper ones alternate. *Leaves* sessile, ovate lanceolate, opposite, serrate towards the summit, acute, and entire at the base. *Flowers* in corymbs, involucre, with acute lanceolate leaves, dotted. *Seed* angled.
White. 4. Aug.—Oct. Dry soils, common. 2–3 feet.

12. E. Rotundifolium. *Stem* pubescent. *Leaves* sessile, decussate, deltoid, obtusely serrate, slightly scabrous, glaucus. *Flowers* in fastigiate corymbs; involucre with pubescent, acute scales. *Seed* angled; pappus scabrous.
Wild horehound.
White. 4 July—Sept. Dry pine barrens. 2–3 feet.

13. E. Verbenæfolium. *Stem* erect, pubescent. *Leaves* sessile, decussate, coarsely toothed, dotted, hairy on the under surface, somewhat deltoid. *Flowers* in corymbs; involucre with hairy, lanceolate leaves. *Seed* angled; pappus scabrous.
White. 4. Aug. Sept. Damp soils. 2–3 feet.

14 E. Pubescens. *Stem* erect, pubescent, lower branches opposite, upper alternate. *Leaves* sessile, ovate, alternate at the summit, obtuse at the base, slightly scabrous, the lower doubly serrate and opposite, the upper slightly serrate and alternate. *Flowers* in fastigiate corymbs; involucre with hairy, linear-lanceolate leaves. *Seed* angled; pappus scabrous.
White. 4. Aug.—Oct. Sandy woods. 2–3 feet.

15. E. Cuneifolium. *Stem* erect, pubescent. *Leaves* obovate, lanceolate, petiolate, lower ones obtusely serrate, the upper with few serratures towards the apex. *Flowers* in corymbs. *Involucre* 8 to 10 leaved.
White. 4 August—September. 10–12 inches.

(b.) Involucre many flowered.

16. E. Perfoliatum. *Stem* erect, striate, villous, covered with glandular dots, lower leaves perfoliate, tapering from the base to the summit, serrate, pubescent on the upper surface, tomentose beneath, the upper leaves distinct, truncate at the base. *Flowers* in large corymbs. *Involucre* many leaved, with acute, linear-lanceolate, pubescent leaves. *Seed* angular. *Bone-set.*
White. 4. Sept.—Oct. At Barhamville, near Columbia. 3–6 feet.

17. E. Ceanothifolium. *Stem* erect, glabrous, or slightly pubescent.—*Leaves* opposite, on short petioles, ovate-lanceolate, acuminate, toothed, slightly scabrous, obtuse at the base. *Flowers* in terminal corymbs. *Involucre* with 10 nearly equal leaves, pubescent. *Seeds* angled. *Pappus* plumose.
White. 4. Sept.—Oct. In rich soils, low country. 2–3 feet.

18. E. Ageratoides. *Stem* erect, glabrous. *Leaves* usually opposite, ovate-lanceolate, acuminate, coarsely toothed, glabrous, on rather long petioles. *Flowers* in corymbs. *Involucre* with 10 nearly equal leaves. *Seeds* angled. *Pappus* slightly scabrous.
White. 4. Sept.—Oct. On the sea coast. 2–3 feet.

19. E. Aromaticum. *Stem* erect, terete, finely pubescent. *Leaves* opposite, cordate, ovate, acute, coarsely toothed, finely pubescent beneath. *Flowers* in terminal corymbs. *Involucre* with 10 nearly equal leaves. *Seed* angled.
White. 4. Fragrant. Aug.—Oct. Dry, rich soils. 2–3 feet.

20. E. Scerotinum. *Stem* erect, almost tomentose. *Leaves* ovate-lanceolate, large, tapering towards the summit; the lower ones opposite, the upper alternate, on rather long petioles. *Flowers* numerous, in fastigiate corymbs. *Involucre* with 10 linear, villous leaves. *Seeds* angled. *Pappus* scabrous.
White. 4. Sept.—Oct. On the sea coast. 5–6 feet.

21. E. Incarnatum. *Stem* erect, very finely pubescent. *Leaves* opposite, on long petioles, cordate, deltoid, obtusely toothed. *Flowers* in terminal

corymbs. *Involucre* with 15-20 nearly equal scales, slightly pubescent. *Seed* angled. *Pappus* pilose.

Purple. Oct.—Nov. In rich soils. 2-3 feet.

22. E. Cœlestinum. *Stem* pubescent. *Leaves* opposite, cordate-ovate, on short petioles, deltoid, slightly scabrous, obtusely toothed. *Flowers* in fastigiate corymbs. *Involucre* with numerous, linear, pubescent leaves. *Seed* angled. *Pappus* scabrous. *Receptacle* conic.

Light blue, with red dots. Fragrant. 4. Sept.—Oct. Rich, shaded soils. 2-3 feet.

(c.) *Involucre with the scales scarious. Leaves verticillate.*

23. E. Teucrifolium. *Stem* erect, striate, pubescent. *Leaves* usually ternate, petiolate, ovate, acuminate, pubescent beneath, toothed, dotted on the under surface. *Flowers* in terminal corymbs. *Involucre* with about 15 linear-lanceolate leaves, the exterior ones shorter and broader. *Seed* angled. *Pappus* pilose.

Light purple. 4. Sept.—Oct. Damp soils. 3-4 feet.

24. E. Purpureum. *Stem* erect, glabrous, or nearly so, tinged with purple. *Leaves* 4-6 in a whorl, oval, lanceolate, petiolate, serrate, somewhat pubescent on the under surface, dotted. *Flowers* in large, terminal corymbs. *Involucre* generally 5-flowered, with the leaves slightly pubescent. *Seed* angled. *Pappus* pilose.

Pale purple. 4. Sept.—Oct. Moist soils. 4-8 feet.

25. E. Maculatum. *Stem* erect, furrowed, with purple dots. *Leaves* 4-5 in a whorl, ovate, lanceolate, acute, at each end, pubescent beneath, unequally serrate. *Flowers* in terminal corymbs. *Involucre*, 5-8 flowered. *Seed* angled.

Pale purple. 4. Aug.—Sept. Moist soils. 4-5 feet.

26. E. Verticillatum. *Stem* erect, glabrous or pubescent towards the summit, tinged with purple. *Leaves* 3-4 in a whorl, ovate-lanceolate, coarsely serrate, glabrous, dotted on the under surface. *Flowers* in terminal corymbs; *Involucre* with 10-12, ovate, obtuse leaves. *Seeds* angled. *Pappus* scabrous.

Purple. 4. Sept.—Oct. Middle and upper Car. and Ga. 4-6 feet.

Remarks.—Many of the species of Eupatorium, possess decided medical properties. The E. Perfoliatum, is a well known domestic medicine, and has been used with much success in arresting disease in its incipient state. It is a tonic and diaphoretic, and in large doses an emetic.

Genus XXXIV. CACALIA.

Involucre cylindric, oblong, scaly at the base; florets all perfect, tubular. *Receptacle* naked. *Pappus* pilose.

1. C. Atriplicifolia. *Stem* erect, branching, glabrous, slightly glaucous. *Leaves* cordate, somewhat reniform, glabrous, toothed, upper ones lanceolate-ovate, glaucous beneath. *Flowers* in terminal corymbs; involucre with 5 equal linear leaves, 5 flowered. *Seed* oblong, ovate, glabrous. *Pappus* scabrous; receptacle with an irregular mass in the center, 3-cleft at the summit.

White tinged with purple. 4. July—Sept. In rich soils in Car. Ga. 3-8 ft.

2. C. Ovata. *Stem* erect, branching at the summit. *Leaves* ovate, obtusely toothed, 7-nerved, glaucous beneath. *Flowers* in fastigiate corymbs; involucre, composed of 5 equal linear leaves. *Seed* glabrous, pappus pilose; receptacle naked, with an irregular projection in the center.

White. 4. September—October. West Georgia, Alabama. 3-4 feet.

3. C. Lanceolata. *Stem* erect, branching towards the summit. *Leaves* long, narrow, lanceolate, remotely dentate, 7-nerved, glaucous beneath.—*Flowers* in terminal corymbs; involucre with 5 linear-lanceolate leaves, with membranaceous margins. *Seed* glabrous, striate; pappus pilose, receptacle small with a projection in the center.

White. 4. August—September. Middle Georgia. 4-6 feet.

Genus XXXV. POLYPTERIS.

Involucre many leaved, oblong, membranaceous, florets all perfect, tubular. *Seed* quadrangular. *Pappus* chaffy.

1. P. Integrifolia. *Stem* erect, slightly scabrous, branching towards the summit. *Leaves* alternate, linear-lanceolate, entire; involucre 8–12 leaved; florets numerous, with a 5-cleft border. *Seed* somewhat scabrous, tapering at the base; pappus consisting of 9 membranaceous scales.
Southern Georgia. 3-4 feet.

Genus XXXVI. SENECIO.

Involucre cylindrical, scaly at the base; scales withered at the point. *Florets* of the disk perfect, of the ray pistillate. *Receptacle* naked. *Pappus* pilose, abundant.

(*a.*) *Flowers with rays.*

1. S. Tomentosus. *Stem* tomentose, or woolly. *Radicle* leaves oblong, oval, serrulate, on long petioles; cauline ones oval-lanceolate, more or less divided. *Flowers* in terminal umbels; involucre many leaved, tomentose at the base; ray florets 12–15, nerved, slightly 3 toothed; pappus setaceous.
White. ♃. April—May. Middle Carolina. 2–3 feet.

2. S. Obovatus. *Stem* simple, glabrous. *Radicle* leaves obovate, or nearly orbicular, crenate, with an attenuated base; cauline leaves much smaller, sessile, pinnatifid, tomentose at the base. *Flowers* in terminal panicles; involucre many leaved, glabrous; ray florets 10–12, those of the disk numerous *Seed* striate; pappus pilose.
Yellow. ♃ June—July. Middle Carolina. 12–18 inches.

3. S. Balsamitæ. *Stem* erect, simple, slender, glabrous. *Radicle* leaves oblong, or ovate, serrate, glabrous, on long petioles, cauline ones pinnatifid, toothed. *Flowers* in terminal umbels; involucre many leaved, membranaceous along the margins: ray florets 10–12-cleft. *Seed* striate; pappus bristly.
Yellow. ♃ April—May. Pine barrens. 1–2 feet.

4. S. Aureus. *Stem* erect, glabrous, slender, sometimes pubescent near the base. *Radicle* leaves cordate, or nearly orbicular, serrate, glabrous, supported on long petioles; cauline leaves, the upper ones amplexicaule, pinnatifid, small, lower ones nearly orbicular. *Flowers* in terminal umbels. *Seed* striate; pappus bristly.
Yellow. ♃ June—July. Mountains. 2–3 feet.

5. S. Fastigiatus. *Stem* erect, glabrous. Radicle leaves oblong-ovate, somewhat acute, dentate, glabrous; cauline ones pinnatifid, with the segments notched and toothed, the terminal segment ovate; involucre with subulate leaflets. *Seed* striate; pappus abundant, setaceous.
Yellow. ♃ May—June. Middle Car. 2–3 ft.

6. S. Lobatus. *Stem* erect, glabrous, angled, fistulous, succulent. *Leaves* pinnatifid, sessile, with spatulate lobes, dentate, glabrous. *Flowers* in corymbose panicles; involucre with linear leaves; ray florets about 12, 3-toothed at the summit. *Seed* striate; pappus bristly. *Butter weed.*
Yellow. ☉ Jan—.May. Common. 1–3 ft.

(*b*) *Ray florets wanting.*

7. S. Suaveolens. *Stem* erect, glabrous. *Leaves* ovate-hastate, serrate, mucronate, petioles winged, colored. *Flowers* in erect corymbs; involucre many leaved, slightly pubescent at the summit, with irregular subulate scales at the base; disk florets numerous. *Seed* striate; pappus pilose.
Yellow. ♃ August—Oct. Middle Car. and Ga. 3–5 ft,

8. S. Hieracifolius. *Stem* erect, pubescent, branching towards the sum-

mit, succulent. *Leaves* alternate, oblong, sessile, unequally notched, or pinnatifid, with acute lobes, pubescent. *Flowers* in compound terminal panicles; involucre with glabrous leaves, ventricose, with irregular setaceous leaflets at the base. *Seeds* slightly pubescent; pappus bristly.

Yellowish white. ☉ June—Sept. Rich soils. Middle Ga. 4–8 ft.

Genus XXXVII. CHAPTALIA.

Involucre imbricate; florets of the ray in a double series, the inner series pistillate, with long styles; disk florets staminate, bilabiate. *Receptacle* naked. *Seed* oblong, striate, glabrous. *Pappus* pilose.

1. C. Integrifolia. *Root* tuberous; scapes several from each root, tomentose, 1-flowered. *Leaves* oblong-lanceolate, retrorsely dentate, white, tomentose beneath. *Flowers* solitary, nodding, leaves of the calyx linear-lanceolate, tomentose; ray florets 16–20 in the outer series.

White and purple. 4 March—April. Damp pine barrens. 12–18 in.

(d) Helianthea. The Sunflower Tribe.

Genus XXXIX. HYMENOPAPPUS.

Involucre many leaved. *Leaves* obovate, nearly round, colored, expanding. *Seed* conical, somewhat pubescent. *Pappus* chaffy, consisting of short, obtuse, denticulate scales. *Receptacle* naked.

1. H. Scabiosæus. *Stem* erect, angular, woolly, tomentose. *Leaves* alternate long, pinnatifid, with remote segments, linear, dentate, the upper ones with entire segments, all tomentose beneath. *Flowers* in terminal corymbs; involucre tomentose, the interior leaves large, colored; florets all perfect, tubular.

White. 4 April—May. Near Macon. 2–3 ft.

Genus XL. MELANANTHERA.

Involucre many leaved. *Leaves* in a double series, equal, oblong-lanceolate. *Florets* all perfect. *Seeds* quadrangular, compressed. *Pappus* consisting of a few bristles. *Receptacle* chaffy, convex.

1. M. Hastata. *Stem* erect, quadrangular, furrowed, scabrous, branching. *Leaves* hastate, 3-lobed, decussate, lanceolate, dentate, scabrous, and somewhat hispid, petiolate. *Flowers* solitary on peduncles, usually in pairs; involucre hispid. *Corolla* tubular, 5-cleft. *Seed* slightly winged at the angles; chaff leaf-like.

White. 4 August—Sept. Rich soils. 4–6 ft.

Genus XLI. MARSHALLIA.

Involucre imbricate. *Florets* all perfect, tubular. *Receptacle* chaffy. *Pappus* consisting of 5 membranaceous scales.

1. M. Lanceolata. *Stem* erect, simple, striate, pubescent towards the summit. Radicle leaves obovate, cauline ones lanceolate, all glabrous, entire, sessile at the base, dilated at the stem, and clasping it. *Flowers* terminal; involucre many leaved, with membranaceous margins; florets nu-

merous, covered externally with a glandular pubescence. *Seeds* angular, striate. *Receptacle* flat.

Pale purple. 4 April—May. Mid. and upper Dist. of Car. & Ga. 1-2 ft.

2. M. Angustifolia. *Stem* erect, branching, angular, glabrous, or slightly pubescent towards the summit. *Leaves* long, narrow-lanceolate, glabrous, the upper ones linear. *Flowers* solitary, terminal: involucre with numerous subulate leaves. *Corolla* pubescent without. *Seed* angular.

Pale purple. 4 May—June. In pine barrens. 1-2 ft.

Genus XLII. CHRYSANTHEMUM.

Involucre imbricate, with subulate leaves; ray florets pistillate, those of the disk perfect; receptacle naked; pappus none.

1. C. Leucanthemum. *Stem* erect, somewhat branched, glabrous, or very slightly pubescent. *Leaves* sessile, amplexicaule, lanceolate, dentate towards the base, or sometimes nearly pinnatifid. *Flowers* solitary; involucre glabrous, with the margins of the leaves membranaceous. *Seed* furrowed.

White. 4 May—July. Close soils. Introduced. 1-2 ft.

Genus XLIII. HELENIUM.

Involucre gamosepalous, many parted; florets of the ray pistillate, of the disk perfect. *Pappus* chaffy, 5-awned. *Receptacle* globose, naked.

1. H. Autumnale. *Stem* erect, branching towards the summit, glabrous, winged by the decurrent leaves. *Leaves* sessile, alternate, lanceolate, doubly serrate, glabrous. *Flowers* in small corymbs: involucre 8-parted, with subulate segments, longer than the disk: ray florets about 10, 3-toothed at the summit. *Seed* angular, larger at the summit; scales of the pappus lacerate, mucronate.

Yellow. 4 October—Nov. In wet soils. 2-3 ft.

2. H. Quadridentatum. *Stem* erect, pubescent, slightly winged, by the decurrent leaves. *Leaves* narrow-lanceolate, entire, pubescent. *Flowers* solitary and terminal; ray florets obovate, 3-4-toothed. *Seeds* hispid; pappus consisting of 6 mucronate scales; receptacle oblong.

Yellow. 4 Sept.—Oct. Swampy lands. 2-3 ft.

Genus XLIV. ACMELLA.

Involucre consisting of 12 leaves, arranged in a double series, pubescent, equal; florets of the ray pistillate, of the disk perfect. *Seed* quadrangular, compressed. *Receptacle* chaffy, with yellow scales.

1. A. Repens. *Stem* procumbent, rooting at the lower joints, pubescent. *Leaves* opposite, ovate-lanceolate, attenuate at the base, slightly pubescent. *Flowers* solitary, on axillary and terminal peduncles. *Leaves* of the involucre ovate-lanceolate, acute; ray florets about 12. *Seed* oblong, naked, truncate at the summit.

Yellow. 4 Sept.—Oct. Wet soils. 1-2 ft.

Genus XLV. HELIOPSIS.

Involucre imbricate, many leaved; ray florets pistillate, those of the disk perfect. *Receptacle* conic. *Seed* quadrangular. *Pappus* wanting.

1. H. Lævis. *Stem* erect, glabrous, dichotomously branched. *Leaves* opposite, ovate-lanceolate, serrate, 3 nerved, glabrous. *Flowers* terminal and in the angles of the stem on long peduncles. *Leaves* of the involucre oblong. *Seed* naked; receptacle convex.
Yellow. 4 May—June. Sandy soils. 2–4 ft.

Genus XLVI. TETRAGONOTHECA.

Involucre gamosepalous, deeply 4-parted, 4-angled, with broad hairy segments. *Receptacle* chaffy. *Seed* obovate, pubescent at the summit. *Pappus* wanting.

1. T. Helianthoides. *Stem* erect, branching, scabrous, somewhat hispid. *Leaves* opposite, sessile, spatulate, lanceolate, dentate, hairy. *Flowers* axillary and terminal; segments of the involucre ovate-lanceolate, with reflected margins; ray florets 6–8, large, of the disk numerous. *Seeds* slightly angled; scales of the receptacle covered with glandular dots.
Yellow. 4 May—June. Sandy soils. 1–2 ft.

Genus XLVII. SIEGESBECKIA.

Involucre many leaved, in a double series, the outer series 5-leaved, expanding; ray florets pistillate, those of the disk, perfect. *Receptacle* chaffy. *Seed* somewhat 4-angled. *Pappus* wanting.

1. S. Laciniata. *Leaves* laciniate, pinnatifid, the upper ones lanceolate, entire, tuberculate; ray florets large.
Yellow. 4 Carolina.

Genus XLVIII. ACTINOMERIS.

Involucre many leaved, with leaves nearly equal; ray florets 4–12, neutral, those of the disk perfect. *Receptacle* chaffy. *Seed* compressed, margined, enclosed by the chaff. *Pappus* 2-awned.

1. A. Helianthoides. *Stem* erect, winged, slightly scabrous. *Leaves* lanceolate, serrate, acute, scabrous, villous beneath. *Flowers* in terminal corymbs; involucre with leaves arranged in two series, ovate-lanceolate, hispid; ray, florets 10–12, those of the disk numerous, slightly winged hairy.
Yellow. 4 June—July. Middle Ga 3–4 ft.

2. A. Squarrosa. *Stem* erect, winged, glabrous when old, or pubescent towards the summit. *Leaves* lanceolate, serrate, scabrous, on short petioles. *Flowers* in leafy panicles; scales of the involucre expanding, arranged in 1–2 series; ray florets about 4 beneath, lanceolate. *Seed* slightly winged, somewhat hairy.
Yellow. 4 August—Oct. Middle and low country Car. & Ga. 3–7 ft.

Genus XLIX. HELIANTHUS.

Involucre imbricate, leafy, generally squarrose; ray florets neutral, those of the disk perfect. *Receptacle* chaffy. *Pappus* 2-leaved, caducous.

(a) *Florets of the disk dark purple.*

1. H. Atrorubens. *Stem* hispid, naked towards the summit, paniculate-

ly branched. *Leaves* opposite, spatulate, acute, crenate, scabrous on the upper surface, pubescent beneath, those towards the base very long, upper ones small, sessile. *Flowers* in terminal panicles; involucre many leaved, ciliate; ray florets lanceolate, nerved. *Seed* compressed. *Pappus* 2 long, deciduous awns. *Receptacle* convex, with the chaff 3-cleft at the summit.

Yellow. 4 Sept.—Oct. Dry soils. Common. 3–4 ft.

2. H. Sparsifolius. *Stem* scabrous, with long slender branches, nearly glabrous. *Leaves* opposite, ovate, coarsely toothed, hispid, scabrous, the upper ones nearly sessile. *Flowers* in loose panicles; involucre with the leaves finely ciliate; ray florets about 14; pappus subulate.

Yellow. 4 August—Oct. Western Ga.

3. H. Angustifolia. *Stem* pubescent slender, sparingly branched. *Leaves* narrow-lanceolate, with revolute margins, scabrous on the upper surface, pubescent beneath, lower ones opposite, upper ones alternate. *Flowers* terminal; ray florets about 12; pappus setaceous ciliate.

Yellow. 4 August—Oct. 2–3 ft.

(*b.*) *Florets of the disk yellowish.*

4. H. Truncatus. *Stem* glabrous, slender, simple, or divided at the base. *Leaves* opposite, rounded at the base, ovate, serrate, tapering towards the summit, hairy, sessile. *Flowers* terminal; involucre, with the leaves somewhat hispid on the inner surface; ray florets 10–12; pappus subulate; chaff of the receptacle pubescent.

Yellow. 4 Aug.—Oct. Western Georgia. 2-3 feet.

5. H. Longifolius. *Stem* glabrous, tinged with purple, paniculately branched. *Leaves* long-lanceolate, nearly sessile, glabrous, the upper ones entire, the lower ones serrate and connate. *Flowers* at the extremities of the branches in corymbs; involucre with nearly glabrous leaves; ray florets about 10; pappus subulate; chaff of the receptacle 3-toothed.

Yellow. 4. Sept.—Oct. In damp soils. Western Ga. 3–4 feet.

6. H. Pubescens. *Stem* erect, pubescent, hoary, nearly simple. *Leaves* sessile, opposite, cordate-ovate, pubescent, with scabrous margins. *Flowers* at the extremities of the branches; involucre with villous, nearly subulate scales; ray florets lanceolate, 14–16. *Seed* compressed, pappus 2 subulate scales, ciliate.

Yellow. 4. Aug.—Sept. Middle Georgia. 2–3 feet.

7. H. Mollis. *Stem* glabrous towards the base, scabrous at the summit, purple. *Leaves* ovate-lanceolate, acute, serrate, pubescent beneath, lower ones opposite, the upper alternate. *Flowers* in a terminal panicle; involucre with numerous, pubescent, ciliate leaves; ray florets about 10, hairy; pappus acuminate, pubescent.

Yellow. 4. July—Aug. Common. 3–6 feet.

8. H. Hispidulus. *Stem* erect, scabrous. *Leaves* opposite, ovate-lanceolate, tapering towards the summit, serrulate, slightly hispid beneath; involucre with scabrous, ciliate leaves; pappus subulate, pubescent; chaff 3-toothed.

Yellow. June.—Sept. Middle Georgia, common. 3–4 feet.

9. H. Strumosus. *Stem* erect, slender, glabrous, sparingly branched.—*Leaves* opposite, narrow, tapering towards the summit, long, pubescent beneath. *Flowers* few, terminal, small for this genus; involucre shorter than the disk, with fringed leaves; ray florets about 6; pappus setaceous; chaff pubescent.

Yellow. 4. Aug.—Sept. 3–4 feet.

10. H. Tenuifolius. *Stem* erect, glabrous. *Leaves* opposite, on rather long petioles, ovate-lanceolate, somewhat tapering at the base, coarsely serrate, slightly scabrous on the upper surface, and slightly pubescent beneath. *Flowers* few, terminal; involucre as long as the disk, with ciliate leaves; ray florets about 10; pappus subulate.

Yellow. 4 August—Oct. Western Georgia.

11. H. Spathulatus. *Stem* striate, scabrous towards the summit, sparingly branched. *Leaves* opposite, ovate, spatulate, tapering towards the summit,

on short petioles, pubescent beneath. *Flowers* at the extremities of the branches: involucre with subulate leaves; ray florets pubescent, 10–12; pappus subulate; chaff hispid.

Yellow. 4. Aug.—Oct. Middle & western Ga. 4–6 feet.

12. H. Tricuspis. *Stem* scabrous. *Leaves* opposite, ovate-lanceolate, scabrous, whitish on the upper surface, brownish beneath, with revolute margins. *Flowers* terminal; involucre with subulate leaves; ray florets 14–16; pappus subulate.

Yellow. 4. Sept.—Oct. Western Georgia. 3–4 feet.

13. H. Diversifolius. *Stem* scabrous, with opposite branches. *Leaves* opposite, the lower ones ovate-lanceolate, tapering at the base, serrulate, the upper ones cordate, ovate, mucronate, nearly entire; petioles hispid, short; involucre shorter than the disk; ray florets 10–12; pappus subulate, pubescent; chaff with 2 lateral teeth.

Yellow. 4. Aug.—Oct. Western Georgia. 3–5 feet.

14. H. Scaberrimus. *Stem* scabrous, slightly branched. *Leaves* opposite, lanceolate, scabrous, nearly entire, whitish. *Flowers* few; involucre with ciliate leaves; ray florets from 16–26; pappus subulate.

Yellow. Sept.—Oct. Western Ga.

15. H. Trachelifolius. *Stem* scabrous, branching. *Leaves* ovate-lanceolate, serrate, attenuate at the base, scabrous, tomentose beneath, whitish above. *Flowers* in terminal panicles; involucre with subulate ciliate leaves; ray florets 10–12; pappus subulate; chaff hairy at the summit.

Yellow. 4 Sept.—Oct. Mountains. 3–4 ft.

16. H. Tomentosus. *Stem* pubescent, scabrous, branched. *Leaves* long, ovate-lanceolate, tapering towards the summit, serrulate, scabrous on the upper surface, tomentose beneath, upper leaves alternate. *Flowers* terminal; involucre with long, ciliate leaves, summits hispid; ray florets 10–14; pappus subulate; chaff 3-cleft, hairy towards the summit.

Yellow. 4 August—Oct. Western Ga. 4–6 ft.

17. H. Dicapetalus. *Stem* pubescent, scabrous, branched. *Leaves* ovate, somewhat spatulate, serrate, scabrous above, pubescent beneath, upper ones alternate. *Flowers* in large panicles; involucre with long ciliate leaves; ray florets 10–12, long; pappus subulate, pubescent.

Yellow. 4 August—Oct. Middle Ga. 3–4 ft.

18. H. Multiflorus. *Stem* scabrous. *Leaves* scabrous, the lower ones cordate, the upper ovate; involucre many leaved, smooth; ray florets numerous.

Yellow. 4 July—Sept. Mountains. 2–3 ft.

19. H. Giganteus. *Stem* somewhat scabrous towards the summit, branching. *Leaves* alternate, lanceolate, serrate, scabrous, tapering at each end, on short petioles, ciliate at the base. *Flowers* in terminal panicles; involucre many leaved, fringed; ray florets 12–14; pappus subulate.

Yellow. 4 August—Oct. Mountains 5–8 ft.

20. H. Altissimus. *Stem* glabrous, purple. *Leaves* alternate, ovate-lanceolate, serrate, scabrous, tapering towards the summit, on short fringed petioles; ray florets about 16; involucre with ciliate lanceolate leaves: chaff green.

Yellow. 4 July—Sept. Mountains. 6–8 ft.

21. H. Divaricatus. *Stem* glabrous, branching. *Leaves* ovate-lanceolate, serrulate, tapering towards the summit, scabrous on the upper surface, glabrous beneath. *Flowers* numerous, small, in terminal panicles: involucre with acute ciliate leaves; ray florets 5–10; pappus consisting of 2 hairy awns.

Yellow. 4 August—Sept. Mountains. 5–6 ft.

22. H. Aristatus. *Stem* scabrous, with slender branches. *Leaves* oval-lanceolate, toothed, sessile, acute, upper ones alternate, the lower opposite. *Flowers* in terminal corymbs; involucre pubescent; ray florets small; pappus consisting of 2 persistent awns.

Yellow. 4 Sept.—Oct. Western Ga. 2–3 ft.

Genus L. BIDENS.

Involucre double, the outer unequal; ray florets neutral when present, frequently wanting; those of the disk perfect. *Receptacle* flat, chaffy. *Pappus* consisting of 4 retrorsely scabrous awns. *Seed* quadrangular.

1. B, Chrysanthemoides. *Stem* glabrous below; somewhat pubescent towards the summit, with opposite branches. *Leaves* sessile, opposite, oblong-lanceolate, serrate, glabrous, somewhat connate; involucre double, the exterior one consisting of about 8 unequal foliaceous leaves; the interior of about the same number of equal, membranaceous leaves; ray florets lanceolate, 8. *Seed* compressed, oblong; pappus consisting of 2 awns which are distinct, and 2 others very minute: receptacle convex.
Yellow. ♃ Oct.—Nov. In wet cultivated lands. 2–3 ft.

2. B. Connata. *Stem* glabrous, with opposite branches. *Leaves* opposite lanceolate, toothed, glabrous, attenuate, at the base, the lower ones ternate, the upper ones simple, all sessile. *Flowers* solitary, on opposite peduncles, the exterior involucre foliaceous, the interior chaffy; ray florets none.
Yellow. ♃ July—Oct. Middle Carolina and Georgia. 2–3 feet.

3. B. Pilosa. *Stem* pubescent, branching, lower leaves dentate, pubescent. *Flowers* solitary, on opposite and terminal peduncles; exterior involucre foliaceous, the interior chaffy; ray florets none.
Yellow. ♃ July—Oct. Common. 2–3 feet.

4. B. Frondosa. *Stem* slightly pubescent, branching. *Leaves* lanceolate, the lower ones pinnate, the upper ternate and simple, slightly pubescent. *Flowers* solitary, on opposite and terminal peduncles; exterior involucre with unequal, ciliate leaves; the exterior chaffy; ray florets none.
Yellow. ♃ June—Sept. Damp soils, common.

5. B. Bipinnata. *Stem* glabrous, obtusely angled, with opposite branches. *Leaves* opposite, decussate, bipinnate; leaflets lanceolate, pinnatifid, slightly pubescent along the margin. *Flowers* on long, usually terminal peduncles; exterior involucre with linear-lanceolate leaves; interior leaves ciliate towards the summit. *Seed* slightly angled.
Yellow. ♃ July—Oct. Common. 2–4 feet.

Genus LI. COREOPSIS.

Involucre double, each many leaved, the exterior equal, the inner one sub-coriaceous, and colored. *Receptacle* chaffy, with flat scales. *Seeds* compressed, emarginate. *Pappus* consisting of 2 awns; ray florets neutral; those of the disk perfect.

(a) Leaves opposite, entire.

1. C. Lanceolata. *Stem* procumbent, glabrous towards the summit, branching at the base. *Leaves* sessile, entire, linear-lanceolate, ciliate towards the base. *Flowers* solitary and terminal, on long, naked branches; involucre with the leaves about equal in both series; ray florets toothed at the summit, about 8. *Seed* compressed, winged; pappus 2 subulate, hairy awns; chaff narrow.
Yellow. ♃ April—May. Damp soils. 1–2 feet.

2. C. Crassifolia. *Stem* pubescent, striate, branched at the base. *Leaves* opposite, oblong, the lower ones alternate at the base, hirsute. *Flowers* terminal; involucre glabrous; ray florets toothed, about 8.
Yellow. ♃ June—July. Pine barrens, common. 1–2 feet.

3. C. Arguta. *Stem* glabrous. *Leaves* lanceolate-ovate, acuminate, ser-

rate. *Flowers* on axillary and terminal peduncles, dichotomously divided.
Yellow. 4. Carolina.

4. C. Œmleri. *Stem* glabrous, angular. *Leaves* sessile, glabrous, acute at each end, clasping, and somewhat connate. *Flowers* opposite, axillary, the upper ones in corymbs, the exterior involucre smaller than the interior; ray florets about 8, entire. *Seeds* compressed, margined.
Yellow. 4. July—August. Upper Carolina.

5. C. Rosea. *Stem* glabrous, simple or branching. *Leaves* opposite, connate; linear, entire. *Flowers* on axillary and terminal peduncles, exterior involucre small; ray florets about 8. *Seed* entire.
Pale red. 4. Aug.—Sept. In damp pine barrens, common. 10–12 in

(*b.*) *Leaves opposite divided.*

6. C. Auriculata. *Stem* pubescent, or nearly glabrous. *Leaves* sessile, entire, oblong-lanceolate, finely pubescent, the lower ones divided, with 2 small lateral leaflets at the base. *Flowers* axillary, and terminal; exterior involucre equal to the interior; ray florets about 8, toothed.
Yellow. 4. August—October. Mountains. 3–4 feet.

7. C. Diversifolia. *Stem* pubescent, dichotomously divided, lower leaves trifoliate, the leaflets obovate, or nearly orbicular, the upper ones spatulate lanceolate, all entire, sprinkled with glandular hairs. *Flowers* on long peduncles, exterior involucre equal to the interior. *Seed* nearly round.
Yellow. 4. May—July. Middle Carolina, Georgia.

8. C. Senifolia. *Stem* pubescent, branching towards the summit, angled. *Leaves* sessile, opposite, trifoliate, leaflets pubescent, lanceolate. *Flowers* in terminal corymbs; exterior involucre equal to the interior, both pubescent; ray florets pubescent on the outer surface, about 8.
Yellow. 4. June—August. Pine lands. 2–3 feet.

9. C. Verticillata. *Stem* erect, angled, striate, glabrous, branching near the summit. *Leaves* opposite, trifoliate, sessile, middle leaflet frequently 3 parted; leaflets, linear lanceolate, entire. *Flowers* in corymbs, exterior involucre usually 10-leaved, interior 8, ray florets 8. *Seed* compressed, chaff filiform, dilated at the summit.
Yellow. 4. June—August. Dry soils. 2–3 feet.

10. C. Tenuifolia. *Stem* glabrous, slightly angled, branching towards the summit. *Leaves* trifoliate, sessile, leaflets many parted, with linear, entire segments. *Flowers* in corymbs, exterior involucre, with about 8 lanceolate leaves.
Yellow. 4. July—August. Upper Carolina. 2–3 feet.

11. C. Trichosperma. *Stem* glabrous, branching. *Leaves* opposite, pinnate, leaflets serrate. *Flowers* in corymbs, exterior involucre, with 8 ciliate leaves; ray florets 8, entire; chaff linear-lanceolate.
Yellow. 4. August—October. Upper Carolina. 2–3 feet.

12. C. Mitis. *Stem* obtusely angled, glabrous, much branched. *Leaves* decussate, bipinnatifid, segments linear serrulate, slightly scabrous. *Flowers* in terminal panicles; exterior involucre, with serrulate, linear leaves, interior pubescent at the base; ray florets 8, obovate.
Yellow. 4. August—September. Wet grounds. 3–4 feet.

13. C. Aristata. *Stem* pubescent. *Leaves* quinnate, leaflets pinnate, serrate. *Flowers* large; florets of the ray entire, broad, oval. *Seed* cuneate, obovate, 2 awned, awns very long, divaricate. *Elliott.*
Yellow. 4. August—September.

14. C. Pubescens. *Stem* pubescent, obtusely angled, sparingly branched. *Leaves* quinnate, pinnate; leaflets lanceolate, obtuse, entire, the lateral ones small. *Flowers* terminal on long branches; exterior involucre about equal to the interior; ray florets 8, broader at the summit. *Seed* slightly winged.
Yellow. 4. August—September. Western Georgia. 2–3 feet.

15. C. Tripteris. *Stem* glabrous, branching towards the summit, fistular. *Leaves* opposite, the upper ones trifoliate; leaflets lanceolate, glabrous, entire,

scabrous along the margin. *Radicle* leaves, pinnate; exterior involucre not as long as the interior; ray florets entire, 8. *Seed* slightly winged.
Yellow. ♃. August—October. Western Georgia. 4–6 feet.

16. C. NUDATA. *Stem* erect, glabrous, striate, dichotomously divided towards the summit. *Leaves* subulate, linear, glabrous, those near the summit smaller. *Flowers* terminal, exterior involucre minute.
Red. ♃. July—August. Southern Georgia. 2–3 feet.

(c.) Leaves alternate.

17. GLADIATA. *Stem* glabrous, striate, dichotomously divided towards the summit. *Leaves* narrow, lanceolate entire, succulent. *Radicle* ones on long petioles. *Flowers* terminal, exterior involucre smaller than the interior, expanding; ray florets 3 lobed at the summit, 8. *Seed* with serrulate wings; pappus pilose; chaff purple.
Yellow. ♃. August—September. Damp pine barrens. 2–3 feet.

GENUS LII. LEPTOPODA.

Involucre many leaved, in double series. *Ray* florets neutral, dilated at the summit, 3-cleft, those of the disk perfect. *Receptacle* convex, naked. *Seed* cylindrical. *Pappus* membranaceous, 8–12 leaved.

1. L. PUBERULA. *Stem* simple, viscidly pubescent, striate, fistular. *Radicle* leaves obovate, or linear-lanceolate, slightly serrate; cauline leaves alternate, linear-lanceolate, glabrous, notched and toothed. *Flowers* terminal, solitary; involucre, with the outer leaves subulate, pubescent, longer than the interior; ray florets numerous. *Seeds* hairy; pappus fimbriate.
Yellow. ♃. April—May. In damp soils. Car. Ga. 2–3 feet.

2. L. DECURRENS. *Stem* glabrous, simple, striate, solid. *Leaves* decurrent, somewhat denticulate. *Flowers* solitary, terminal. *Involucre* with the interior leaves subulate, pubescent at the summit; ray florets somewhat pubescent. *Seed* glabrous, pappus, awned, fimbriate.
Yellow. ♃. March—April. Middle Georgia. 1–2 feet.

GENUS LIII. BALDWINA.

Involucre many leaved, imbricate, squarrose. *Ray* florets neutral, those of the disk perfect. *Receptacle* convex, pitted. *Seeds* immersed in the receptacle. *Pappus* membranaceous, consisting of 10 acute leaves.

1. B. UNIFLORA. *Stem* simple, slightly angled, pubescent. *Leaves* obovate tapering at the base, narrow, entire, pubescent when young. *Involucre* squarrose, with the leaflets ovate, the interior mucronate. *Ray* florets numerous pubescent, 3-toothed at the summit. *Seed* hairy, enlarged toward the summit. *Pappus* consisting of acute, membranaceous scales.
Yellow. ♃. July—September. Damp soils. Middle Car. Ga. 1–2 ft.

2. B. MULTIFLORA. *Stem* glabrous, much branched, terete. *Leaves* linear, glabrous, sessile, alternate. *Flowers* at the extremities of the branches. *Involucre* imbricate, many leaved, glandular, oval. *Ray* florets small. *Seed* enlarged at the summit, pubescent. *Pappus* with numerous scales, expanding, obtuse.
Yellow. ♃. September—October. Middle & Southern Ga. 2–3 feet.

GENUS LIV. RUDBECKIA.

Involucre in a double series, nearly equal. *Ray* florets

neutral, the disk perfect. *Receptacle* conic, chaffy. *Pappus* a 4-toothed margin.

1. R. Purpurea. *Stem* somewhat branched, smooth or a little roughened. *Leaves* ovate-lanceolate, scabrous, tapering towards the base, those towards the upper part of the stem narrower, all coarsely serrate. *Flowers* terminal. *Involucre* many leaved, imbricate, ciliate, in several series, squarrose. *Ray* florets long, narrow, 2-cleft, reflexed. *Seed* angled, enlarged at the summit. *Chaff* of the receptacle with rigid points; longer than the florets.
Purple. 4. August—October. Upper Carolina & Georgia. 4–5 feet.

2. R. Pinnata. *Stem* hispid, furrowed. *Leaves* pinnate, lower segments sometimes 2-parted. *Flowers* large, showy; involucre with the leaves nearly equal; ray florets long, reflexed, those of the disk purple.
Yellow. 4 July—Oct. Upper districts of Car. and Ga. 4–5 ft.

3. R. Digitata. *Stem* erect, glabrous, branching, lower leaves pinnate, with pinnatifid segments; the upper ones simple, pinnate, the highest 3-cleft. *Involucre* shorter than the disk, somewhat pubescent, with ovate-lanceolate leaves. *Pappus* a 4-toothed margin. *Chaff* tomentose at the summit.
Yellow. 4 August—Oct. Mountains. 5–8 ft.

4. R. Laciniata. *Stem* erect, glabrous, branching. *Leaves* scabrous, the lower ones pinnate, with 3-lobed segments, coarsely toothed, sometimes laciniate, upper leaves nearly sessile, ovate or 3-cleft, sometimes dentate. *Flowers* in terminal panicles. *Involucre* shorter than the disk, with small ovate-lanceolate leaves. *Ray* florets about 6, dilated at the summit, 3-toothed. *Pappus* a crenate margin. *Chaff* tomentose.
Yellow. 4 August—Sept. In moist places. Middle Ga. 4–6 ft.

5. R. Triloba. *Stem* hairy, hispid, paniculately branched, branches leafy, divaricate. *Leaves* lanceolate, acuminate at each end, serrate, the lower ones 3-lobed, hairy, upper ones lanceolate, serrate, sessile. *Flowers* numerous at the extremities of the branches. *Involucre* with reflected leaves. *Ray* florets lanceolate, reflected, about 8. *Pappus* a 4-toothed margin.
Yellow. 4 August—Sept. Mountains. 4–5 ft.

6. R. Tomentosa. *Stem* erect pubescent, slightly furrowed, much branched, branches erect, virgate. *Leaves* alternate, lanceolate, acute, scabrous, tomentose, the lower ones somewhat trifoliate, upper leaves entire. *Flowers* at the extremities of the branches. *Involucre* tomentose, with nearly subulate reflexed leaves. *Ray* florets about 8. *Pappus* almost wanting.
Yellow. 4 Sept.—Oct. Middle & western Ga. 3–4 ft.

7. R. Mollis. *Stem* erect branching, covered with a hispid pubescence. *Leaves* alternate, ovate-lanceolate, sessile, dentate, slightly cordate, pubescent. *Flowers* at the extremities of the branches. *Involucre* hairy, with reflexed leaves. *Ray* florets 12–20. *Pappus* nearly wanting.
Yellow. 4 August—Oct. Western Ga. 2–3 ft.

8. Lævigata. *Stem* glabrous. *Leaves* ovate-lanceolate, somewhat coriaceous, shining. *Radicle* leaves ovate-spatulate, dentate. *Flowers* on long, naked peduncles. *Involucre* with long lanceolate leaves. *Ray* florets rather short.
Pale yellow. 4 July—Aug. Pine barrens. 2–3 ft.

9. R. Discolor. *Stem* pubescent, branching. *Leaves* alternate sessile, strigose, pubescent, lanceolate, entire, or finely denticulate. *Flowers* terminal. *Involucre* somewhat pubescent. *Ray* florets 12–14, hairy on the outer surface. *Pappus* a minute margin. *Chaff* purple, fringed at the summit.
Yellow. 4 August—Sept. Middle & western Ga. 2–3 ft.

10. R. Spathulata. *Stem* pubescent slender. *Leaves* entire, obovate-spatulate. *Flowers* solitary, terminal. *Involucre* imbricate, expanding. *Ray* florets 3-toothed.
Yellow. 4 July—Aug. Mountains. 10–18 in.

11. R. Fœtida. *Stem* hispid, with long virgate 1-flowered branches. *Leaves* numerous, oblong-lanceolate, alternate, sessile, hispid, tapering at the

base. *Involucre* hispid, exterior leaves largest, somewhat foliaceous. *Ray* florets 12–14, 2-cleft. *Pappus* a slight margin. *Chaff* glabrous.
Yellow. August—Oct. Mountains. 2–3 ft.

12. R. HIRTA. *Stem* hirsute, sparingly branched. *Leaves* alternate, sessile, spatulate lanceolate, hirsute, upper ones narrower. *Flowers* solitary, terminal. *Involucre* many leaved, hairy; exterior leaves the largest. *Pappus* wanting. *Chaff* fringed at the summit.
Yellow. ♃ June—Sept. Sandy soils. Common. 2–3 ft.

13. R. ARISTATA. *Stem* erect, corymbosely branched. *Leaves* serrate, lanceolate, hispid. *Flowers* at the extremities of the branches. *Involucre* many leaved, disk nearly hemispherical. *Pappus* subulate.
Yellow. ♃.

GENUS LV. SILPHIUM.

Involucre leafy, squarrose. *Ray* florets pistillate, those of the disk staminate. *Seed* compressed, obcordate, emarginate, 2 toothed. *Receptacle* chaffy.

1. S. LACINIATUM. *Stem* hispid, simple, nearly glabrous towards the base. *Leaves* alternate, about 2 feet long and 1 wide, pinnatifid, the segments toothed and sinuate, scabrous. *Involucre* consisting of 10 leaves, subulate. *Ray* florets numerous, about as long as the involucre. *Pappus* 2 small awns.
Yellow. ♃ August—Sept. Western Ga 8–12 ft.

2. S. PINNATIFIDUM. *Stem* glabrous. *Leaves* large, pinnatifid, sinuate; segments usually acute, upper surface glabrous, the under slightly scabrous. *Flowers* in panicles, large. *Involucre* glabrous with the exterior leaves orbicular, the interior oval.
Yellow. ♃ July—Western Ga. and Ala. 4–6 ft.

3. S. COMPOSITUM. *Stem* glabrous. *Leaves* irregularly lobed, sinuate, sometimes pinnatifid, glabrous above, somewhat hairy beneath. *Flowers* in terminal panicles. *Involucre* with the leaves slightly ciliate.
Yellow. ♃ May—Aug. Pine barrens 2–3 ft.

4. S. TEREBINTHINACEUM. *Stem* erect, glabrous. *Radicle* leaves cordate or nearly orbicular, or reniform, sometimes lobed and dentate; cauline ones alternate, serrate, scabrous, ovate. *Flowers* numerous, in corymbose panicles, exterior leaves of the involucre ovate, acute, the interior obtuse. *Ray* florets 10–12.
Yellow. ♃ July—Aug. Mountains. 4–5 ft.

5. S. PERFOLIATUM. *Stem* glabrous, quadrangular. *Leaves* opposite, connate, serrate, ovate, the upper ones perfoliate, broad. *Flowers* on axillary peduncles. *Involucre* squarrose. *Ray* florets 24.
Yellow. ♃ July–Sept. Mountains. 4–6 ft.

6. S. CONNATUM. *Stem* erect, terete, hispid, with reflexed hairs. *Leaves* opposite, perfoliate, scabrous, serrate. *Flowers* in terminal panicles. *Involucre* squarrose, with ovate leaves, reflexed at the summit. *Ray* florets 12.
Yellow. ♃ August—Sept. Middle & western Ga. 4–5 ft.

7. S. INTEGRIFOLIUM. *Stem* quadrangular, hispid. *Leaves* opposite, sessile, oblong, entire, scabrous on the upper surface. *Flowers* few, on short peduncles. *Involucre* with oblong ovate leaves.
Yellow. ♃ August—Sept. Mountains. 3–4 ft.

8. S. LÆVIGATUM. *Stem* quadrangular, glabrous. *Radicle* leaves lanceolate, oblong; the lower cauline ones oval-lanceolate, on short petioles, which are connate at the base; the upper ones sessile, ovate, the highest cordate, glabrous. *Flowers* in corymbs. *Involucre* with ciliate leaves, the inner ones largest.
Yellow. ♃ August—Sept. Middle Ga 2–3 ft.

9 S SCABERRIMUM. *Stem* angled when young, becoming terete when old,

scabrous towards the summit. *Leaves* on short petioles, connate at the base, ovate, serrate, rigid, scabrous. *Flowers* in corymbs. *Involucre* with ovate ciliate leaves, exterior ones smallest. *Seed* nearly circular, winged.

Yellow. 4 August—Sept. Middle and western Ga. 3–4 ft.

10. S. TRIFOLIATUM. *Stem* glabrous, somewhat hexagonal, usually purple. *Leaves* ovate-lanceolate, serrulate, slightly scabrous on the upper surface, glabrous beneath, the upper ones nearly sessile, the lower ternate. *Flowers* in terminal corymbs. *Involucre* with ovate, ciliate, loosely appressed leaves. *Ray* florets about 14.

Yellow. 4 August—Oct. Mountains. 4–5 ft.

11. S. TORNATUM. *Stem* terete, or slightly angled, glabrous. *Leaves* verticillate, by threes, lanceolate, acute, denticulate or serrate, slightly scabrous on the upper surface, pubescent along the veins beneath. *Flowers* in terminal corymbs. *Involucre* ciliate, with ovate, loosely appressed leaves. Ray florets 12–14, long.

Yellow. 4 August—Oct. Mountains. 4–6 feet.

12. S. ATROPURPUREUM. *Stem* erect, terete, purple, glabrous. *Leaves* mostly verticillate, by fours, numerous, the lower ones alternate, and the uppermost scattered, the intermediate ones sometimes by threes; all lanceolate, scabrous, dentate, on ciliate petioles; midrib purple. *Flowers* in dichotomous panicles. *Involucre* ciliate, with ovate scales. Ray florets long, narrow.

Yellow. 4 Aug.—Sept. Upper districts. 4–5 feet.

13. S. DENTATUM. *Stem* erect, purple, glabrous. *Leaves* broad-lanceolate, sinuate, toothed, hairy, scabrous, the lower ones opposite, upper ones alternate, sessile. *Flowers* in terminal corymbs. *Involucre* ciliate, with broad-ovate leaves. Ray florets about 10, oval.

Yellow. 4. Aug.—Sept. Common near Culloden. 2–3 ft.

14. S. ASTERACEUS. *Stem* erect, terete, hispid. *Leaves* lanceolate, acute, serrate, scabrous; the lower ones opposite, petiolate, the upper ones alternate, sessile. *Involucre* ciliate, with ovate leaves. Ray florets 8–10.

Yellow. 4 June—Aug. Sunny soils, common. 2–3 ft.

15. S. PUMILUM. *Stem* erect, or procumbent, terete, tomentose. *Leaves* alternate, oblong, irregularly dentate, acute, petiolate, pubescent on the upper surface, tomentose beneath. *Flowers* in irregular corymbs. *Involucre* tomentose, with the leaves ovate, 8–10. Ray florets 8–10, tomentose on the under surface.

Yellow. 4 July—Aug. Pine barrens. Mid. Car. & Ga. 2–3 ft.

GENUS LVI. POLYMNIA.

Involucre double, the exterior usually 5-leaved, the interior 10-leaved. Ray florets pistillate, those of the disk staminate. *Receptacle* chaffy. *Pappus* none.

1. P. CANADENSIS. *Stem* erect, viscid, villous, somewhat scabrous. Lower leaves deeply lobed, or pinnatifid, the upper ones entire or 3 lobed, all finely serrate, somewhat ovate, slightly scabrous. *Flowers* in terminal panicles. *Involucre* viscid and villous. Ray florets 10, small.

Yellow. 4 July—Sept. Mountains. 2–4 feet.

2. P. UVEDALIA. *Stem* erect, villous, terete, scabrous. *Leaves* opposite, 3–5-lobed, or ternate, leaflets or lobes, tomentose, ovate, scabrous, petiole winged. *Flowers* in a terminal panicle, with opposite or ternate branches. *Involucre* with the exterior scales largest, ciliate, ovate; the interior lanceolate, villous. Ray florets 10, 3-toothed at the summit. *Seeds* globose, somewhat compressed, glabrous.

Yellow. 4 June—August. Common. 3–5 feet.

Genus LVII. CHRYSOGONUM.

Involucre 5-leaved, oblong, villous. *Ray florets* pistillate, those of the disk staminate. *Receptacle* chaffy. *Seed* enfolded in a 4-leaved calyx. *Pappus* 1-leaved, pubescent at the summit.

1. C. Virginianum. *Stem* decumbent, villous. *Leaves* opposite, oblong, lanceolate-oval, crenately dentate, attenuate at the base into a long petiole, villous. *Flowers* solitary. *Involucre* villous. Ray florets 5, broad. *Seeds* compressed, somewhat pubescent.
Yellow. 4 April—June Common. 4–12 inches.

(e) Anthemideæ, Chamomile, or May-Weed tribe.

Genus LVIII. SANTOLINA.

Involucre hemispherical, imbricate, with the leaves keeled, having scarious points. *Ray* florets wanting, those of the disk perfet. *Receptacle* chaffy. *Pappus* wanting.

1. S. Suaveolens. *Stem* erect, glabrous, branched. *Leaves* bipinnatifid; segments acute, linear. *Flowers* in terminal corymbs. *Lavender Cotton.*
Yellow. ☺ June—July. On the Southern coast.

Genus LIX. ARTEMISIA.

Involucre imbricate, with the leaves round, connivant. *Ray* florets none. *Receptacle* naked. *Pappus* none.

1. A. Caudata. *Stem* erect, simple, glabrous, paniculately branched. Radicle and lower cauline leaves sub-bipinnate, pubescent, upper ones subpinnate; segments sub setaceous, convex, alternate, divaricate. *Flowers* erect, pedicillate, globose, in dense panicles.
Yellow. 4 July—Aug. On the sea shore. 2–6 feet.

Genus LX. SPARGANOPHORUS.

Involucre imbricate, sub-globose, pubescent, with the leaves recurved at the the summit. *Ray* florets wanting, those of the disk perfect. *Receptacle* naked. *Seed* glabrous, pentangular. *Pappus* membranaceous, 5-cleft.

1. S. Verticillatus *Stem* pubescent, simple. *Leaves* linear, glabrous, verticillate, generallay 6 in a whorl. *Flowers* generally terminal and solitary. *Involucre* with lanceolate, colored leaves.
Purple. 4 July—Aug. Pine barrens. Mid. Car. & Ga. 10–16 in.

Genus LXI. ANTHEMIS.

Involucre hemispherical, many leaved, with leaves nearly equal. *Ray* florets pistillate; disk florets perfect. *Receptacle* chaffy, with the chaff rigid and acuminate. *Seed* naked. *Pappus* wanting or none.

1. A. Cotula. *Stem* erect, pubescent, slightly angled, much branched. *Leaves* bipinnate, with subulate, 3-parted segments. *Flowers* in terminal

corymbs. *Involucre* many leaved, pubescent *Ray* florets 10–12. *Seed* slightly angular. *Receptacle* conic, with subulate chaff. *May weed.*
White. ☉ May—June. Moist soils. Very common. 1–2 feet.

Genus LXII. ACHILLEA.

Involucre ovate, imbricate, many leaved. *Ray* florets pistillate, those of the disk perfect. *Receptacle* chaffy. *Pappus* none.

1. A. Millefolium. *Stem* erect, pubescent, furrowed, branched at the the top. *Leaves* bi-pinnate, with the segments linear, acute, glabrous. *Flowers* in dense, terminal corymbs. *Involucre* with the leaves ovate-lanceolate, pubescent. *Ray* florets 4–5. *Yarrow*
White, or pale red. ♃ July—August. 1–2 feet.

Genus LXIII. VERBESINA.

Involucre many leaved, in a doble series. *Ray* florets pistillate, about 5, disk florets perfect. *Receptacle* chaffy. *Pappus* 2-awned.

1 V Virginica. *Stem* erect, irregularly winged, pubescent, slightly furrowed. *Leaves* alternate, broad-lanceolate, acute, attenuate at the base, dentate, pubescent and scabrous on the upper surface, tomentose beneath. *Flowers* in terminal corymbs. *Involucre* imbricate, pubescent, shorter than the disk. *Ray* florets about 3, of the disk about 15. *Seed* hairy, compressed. *Chaff* hairy.
White. ♃ Aug. Sept. Mid. Car. & Ga. 3–6 feet.

2. V. Sinuata. *Stem* erect, pubescent, winged towards the base, striate. *Leaves* alternate, sessile, spatulate, or ovate, those on the middle of the stem sinuate, with acute lobes, scabrous on the upper surface, pubescent beneath. *Involucre* pubescent, shorter than the disk. *Ray* florets 3–5. *Seed* winged, cuneate
White. ♃. Octobor—November. On the sea coast. 4–6 feet.

3. V. Scorisbrickia. *Stem* erect, pubescent, 4 winged branches bracteate. *Leaves* opposite, ovate, acuminate, denticulate, pubescent, alternate at the base. *Flowers* in fastigiate corymbs. *Involucre* pubescent. *Ray* florets 1–3, 3-toothed. *Seed* hispid obovate. *Chaff* pubescent.
Yellow. ♃. June—August. Common. 4–6 feet.
(f.) Ambrosiaceæ, Hog weed, or Clot-bur tribe.

Genus LXIV. PARTHENIUM.

Involucre 5-leaved, villous. *Ray* florets small, pistillate, those of the disk staminate. *Receptacle* flat, chaffy. *Seed* obovate. *Pappus* none.

1. P. Integrifolium. *Stem* erect, slightly scabrous striate. *Leaves* alternate, ovate lanceolate, unequally toothed, sessile, scabrous, the upper ones amplexicaule. *Flowers* in terminal corymbs. *Ray* florets 5, small, the exterior chaff broad.
Yellow. ♃. June—September. Middle Car. Ga. 1–2 feet.

Genus. LXV. IVA.

Involucre 5–10 leaved. *Ray* florets pistillate, those of the disk staminate. *Anthers* not united. *Receptacle* bristly.—*Seed* obovate. *Pappus* none.

1. I. Frutescens. A shrub with numerous opposite branches, slightly furrowed, somewhat scabrous and pubescent when young. *Leaves* opposite, lanceolate, attenuate at the base, deeply serrate, scabrous, of a greenish hue. *Flowers* axillary, forming terminal panicles. *Involucre* viscidly pubescent 5-leaved, leaves nearly round. *Ray* florets 5, those of the disk 6–7.

Pale purple. ♄. July—September. On the sea coast. 3–8 feet.

2. I. Imbricata. *Stem* herbaceous, terete, slightly angled towards the summit, glabrous, becoming purple. *Leaves* sessile, linear-lanceolate, cuneate, succulent, the upper ones usually alternate and entire, the lower frequently opposite and toothed. *Flowers* axillary, pendulous. *Involucre* with 6–9 fleshy leaves, with the margins lacerate. *Ray* florets 2, those of the disk numerous.

White. ♃. July—October. On the sea coast.

Genus LXVI. AMBROSIA.

Flowers numerous, staminate florets, with the involucre hemispherical, 1-leaved, many flowered. *Anthers* approximate, but not united. *Receptacle* naked, pistillate florets with the involucre 1-leaved, entire, or 5-toothed, 1-flowered. *Corolla* none. *Styles* 2. *Fruit* a nut formed from the indurated calyx, 1-seeded.

1. A. Trifida. *Stem* erect, rough, hirsute. *Leaves* usually opposite, 3-lobed, serrate, the lobes oval lanceolate, acuminate, hairy, serrate. *Flowers* in small axillary and terminal spikes, forming a large panicle, staminate florets numerous, solitary at the summit of the spike, pistilate ones in small clusters at the base. *Involucre* of the staminate, florets 5–8 lobed, hairy. *Corolla* tubular. *Involucre* of the fertile florets persistent, 5-lobed. *Fruit* with 6 spines. *Bitter weed.*

White. ☉. August—September. Common. 4–6 feet.

2. A. Elatior. *Stem* virgate, pubescent when young. *Leaves* bipinnatifid, nearly glabrous; petioles ciliate. *Flowers* in paniculate racemes. *Involucre* of the staminate florets, globular, somewhat hairy, fertile florets in small clusters. *Nut* with 6 short spines. *Hog weed. Roman wormwood.*

White. ☉. July—September. Middle, upper Car. Ga. 4–8 feet.

3. A. Artemisifolia. *Stem* erect, slightly pubescent, fastigiately branched. *Leaves* towards the base bipinnatifid, opposite, those towards the summit, pinnatifid opposite, nearly glabrous on the upper surface, pubescent beneath. *Racemes* terminal by threes. *Involucre* of the staminate florets, globular; fertile florets axillary, sessile, spines short.

White. ☉. August—September. Mountains. 4–6 feet.

4. A Paniculata. *Stem* erect, paniculately branched, villous. *Leaves* alternate towards the base, bipinnatifid towards the summit; segments all lanceolate acute, pubescent. *Flowers* in terminal and axillary racemes, the upper staminate, the lower fertile. *Involucre* of the staminate florets 10-toothed, 10-flowered. *Fruit* muricate, clustered, small, obovate.

White. ☉. July—Sept. Cultivated grounds, very common. 2–6 ft.

Genus LXVII. XANTHIUM.

Flowers monœcious. *Staminate florets, involucre* imbricate. *Anthers* approximate, not united. *Receptacle* chaffy. *Fertile florets. Involucre* 2-leaved, 2-flowered. *Corolla* none. *Drupe* dry muricate, 2-cleft. *Nut* 2-celled.

1. H. Strumarium. *Stem* erect, pubescent, scabrous, angled. *Leaves* alternate, cordate, usually 3-lobed, serrate, pubescent, very large, on long peti-

oles. *Pistillate florets* in axillary racemes. *Involucre* consisting of subulate leaves. *Chaff* subulate. *Fertile florets* at the base of each raceme. *Involucre* 10-leaved, 2-flowered. *Fruit* eliptic, pubescent, armed with hooked bristles. *Clott-Bur. Sheep Bur.*

White. ☺. July—October. Very common. 3–6 feet.

2. H. Strumosum. *Stem* pubescent, terete, with ternate spines from each side of the petiole. *Leaves* alternate, 3-lobed, ovate-lanceolate, pubescent on the upper surface, tomentose beneath. *Staminate florets* solitary at the base of each spine. *Involucre* many leaved. *Fertile florets* axillary, solitary.—*Fruit* armed with short prickles. *Fruit* 2-celled. *Prickly Clot weed.*

White. ☺. July—Oct. Common along the coast. 3–5 feet.

Order LXXVI. DIPSACEÆ.

Flowers collected into an ovate or roundish head. *Involucre* foliaceous, many leaved; proper calyx superior, 1-leaved. *Corolla* tubular, inserted into the calyx, with the limb oblique, 4-cleft. *Stamens* 4, alternate with the lobes of the corolla. *Anthers* distinct. *Ovary* inferior, 1-celled, with a solitary pendulous ovule. *Style* 1. *Fruit* dry, 1-celled, crowned by a pappus-like calyx.

Genus I. DIPSACUS.

Genus same as the order

1. D. Sylvestris. *Stem* erect, angular, prickly. *Leaves* opposite. *Involucre* many leaved, curved upwards. *Flowers* in dense oval heads, shorter than the scales of the receptacle. *Teasel.*

Blue. ♂ July. Introduced. 3–5 ft.

Order LXXVII. PLANTAGINEÆ.

Calyx 4-parted, persistent. *Corolla* 4-cleft. persistent. *Stamens* 4, inserted into the corolla alternate with the segments. *Filament* long. *Anthers* versatile, 2-celled. *Ovary* usually 2-celled. *Style* simple. *Stigma* hispid. *Capsule* membranaceous, with a transverse dehiscence. *Herbaceous* plants, with flowers on scapes.

Genus I. PLANTAGO.

Genus same as the order.

1. P. Major. *Stem* none. *Leaves* broad-ovate, glabrous, on rather long petioles, remotely toothed, 5-nerved; petiole pubescent; scape pubescent. *Flowers* in bracteate spikes; segments of the calyx, lanceolate, glabrous. *Capsule* 2-celled, the upper half falling off when the seeds are mature. *Plantain.*

White. ♃ June—Aug. Common. 8–12 in.

2. P. Virginica. *Stem* none. *Leaves* spatulate, lanceolate, pubescent, sparingly dentate, 5-nerved, the two marginal ones obscure; scape tomentose, angular, columnar. *Flowers* remote when mature.

Yellowish. ♂ June—July. Common. 1–6 in.

3 P. Lanceolata. *Stem* none. *Leaves* long, tapering, lanceolate, 5-nerved, slightly pubescent, sparingly dentate; scape hairy. *Flowers* in a compact spike; bracts ovate.
White 4 Through the Summer. Introduced. 1–2 ft.

4. P. Interrupta. *Stem* none. *Leaves* long, narrow, lanceolate, 3–5-nerved; scape pubescent near the base, spike long slender. *Flowers* scattered, glabrous, occasionally in clusters.

Order LXXIX. PLUMBAGINEÆ.

Calyx tubular, plaited, entire, persistent, scarious. *Petals* (the only genus belonging to this order, found in our geographical limits.) 5, regular. *Stamens* 5, inserted on the petals. *Ovary* superior. *Ovule* inverted, pendulous, suspended from the point of a strap-like umbilical cord, which arises from the base of the ovary. *Stigmas* 5. *Fruit* indehiscent. *Seed* inverted. *Embryo* straight. *Herbaceous* plants, with sheathing leaves. *Flowers* in panicles.

Genus I STATICE.

Genus the same as the Order.

1. P. Limonium. *Root* thick, ligneous, scaly towards the summit. *Radicle* leaves obovate, obtuse, narrowed at the base, on long petioles, those of the scape barely scales, embracing the stem and branches. *Flowers* in panicles, consisting of secund spikes. *Involucre* 3-leaved, 2-flowered, the upper one colored. *Calyx* 10-toothed, pubescent at the base. *Petals* obovate. *Anthers* purple. *Capsule* 5 angled. *Seed* angled. *Marsh Rosemary.*
Blue. 4 July—Oct. Along the seacoast.

Remarks.—The root of this plant possesses decided medicinal properties. It is very astringent, and may be used as a substitute for the most astringent medicines. In ulcerated sore mouth it forms a most valuable gargle, in the form of infusion or decoction.

Order LXXX. LABIATEÆ.

Calyx tubular, persistent, regular, or bilabiate, hypogynous. *Corolla* bi-labiate, with the upper lip entire, or bifid, the lower 3-cleft. *Stamens* 4-didynamous, the two shorter being sometimes abortive, inserted into the corolla. *Ovary* 4-lobed. *Ovules* 4. *Style* 1, arising from the base of the lobes. *Stigma* bifid. *Fruit* enclosed within the persistent calyx. *Seed* erect, with little or no albumen. Usually herbaceous plants, with whorled, spiked, or capitate flowers, and square stems, and opposite branches and leaves.

Genus I LYCOPUS.

Calyx tubular, 5-cleft, throat naked. *Corolla* tubular 4-cleft, segments nearly equal, the upper segment rather broader, and emarginate. *Stamens* 2, distant. *Seeds* 4.

1 L. Virginicus. *Stem* erect, square, pubescent, branched. *Leaves* broad-lanceolate, serrate, sessile, acuminate, tapering at the base. *Flowers* in crowded axillary whorls, sessile. *Calyx* persistent, unarmed, shorter than the seed. *Anthers* 2-lobed, purple. *Bugle weed.*

White. ♃ June—Aug. Wet soils, common. 1–2 ft.

2 L. Asarifolius. *Stem* erect, glabrous, square. *Leaves* narrow-lanceolate, acuminate, the upper ones slightly, and the lower ones deeply toothed. *Flowers* in dense whorls, sessile. *Calyx* armed with spines, longer than the seed, with the segments acuminate. *Water Horehound.*

White. ♃ August—Sept. Wet places. 1–2 ft.

3 L. Exaltatus. *Leaves* at the base pinnatifid, serrate, with the segments entire and slightly serrate. *Calyx* spinous. *Elliott.*

August—September.

4 L. Sinuatus. *Stem* erect, furrowed, glabrous, square. *Leaves* sinuate and incised, and sometimes dentate; the segments acute. *Flowers* in dense sessile whorls; segments of calyx acute, longer than the seeds.

White. ♃ August—Sept. In swamps. 4–6 feet.

Remarks. The *Lycopus Virginicus* is a medicinal plant possessing mild narcotic properties. In hemorrhage from the lungs it has been used with advantage, it being taken in the form of infusion.

Genus II MENTHA.

Calyx tubular, ciliate, glabrous, 5-toothed. *Corolla* funnel-shaped, with the border nearly equally 4-cleft, with the upper segments emarginate. *Stamens* erect, distant.

1 M. Viridis. *Stem* procumbent, assurgent, branching, glabrous, rooting at the joints. *Leaves* opposite, ovate-lanceolate, serrulate, on short petioles. *Flowers* in whorls, numerous; tube of the corolla rather longer than the calyx. *Stamens* short. *Seeds* 4. *Spear mint.*

Purple. ♃ July—Aug. In wet soils. 1–2 feet.

Remarks. This is one of the species of the genus from which the *Oil of Peppermint* of the shops is obtained. This oil exists in the whole plant and is distilled with water, or it yields the oil to alcohol by maceration. It is an aromatic stimulant, and is extensively used as a family medicine.

Genus III PYCNANTHEMUM.

Calyx tubular, striate, 5-toothed. *Corolla* with the upper lip nearly entire, the lower one trifid, with the middle segment longest. *Stamens* distant. *Cells* of the anthers parallel. *Flowers* in heads, surrounded by a many leaved involucre.

1 P. Incanum. *Stem* quadrangular, pubescent towards the summit, glabrous at the base. *Leaves* opposite, oblong, ovate, acute, pubescent, hoary. *Flowers* in lateral and terminal heads. *Bracts* setaceous. *Calyx* tomentose, striate. *Corolla* pubescent on the inner surface. *Stamens* exserted. *Seeds* rugose. *Wild-basil.*

Yellow, spotted with purple. ♃ August—Sept. In dry fertile soils. 3–6 ft.

2 P. Aristatum. *Stem* square, pubescent, much branched. *Leaves* lanceolate-ovate, slightly serrate, on short petioles, whitish. *Flowers* in one or two sessile whorls, and a terminal head, bracts awned. *Calyx* with the segments terminated by long awns. *Corolla* glabrous small.

White. ♃ July—August. Mountains. 2–3 feet.

3. P. Montanum. *Stem* glabrous, purple. *Leaves* oval-lanceolate, serrate, nearly sessile. *Flowers* in one or two whorls, and a terminal head.—

Calyx erect, bracts ciliate. *Corolla* with the throat pubescent. *Stamens* exserted. *Seed* hairy at the summit.

Purple, spotted. 4. July—August. Mountains. 1-2 feet.

4. P MONARDELLUM. *Stem* erect, pubescent. *Leaves* oval, slightly cordate, obtuse, serrate. *Flowers* in terminal heads. *Bracts* large, colored, ciliate.—*Calyx* bearded at the summit. *Corolla* small.

Pale red. 4. July—August. Mountains. 2-3 feet.

5. P. NUDUM. *Stem* erect, simple, glabrous. *Leaves* sessile, oblong-ovate, glabrous, entire. *Flowers* in numerous heads. *Bracts* smooth, lanceolate.—*Calyx* covered with resinous dots. *Corolla* pubescent. *Stamens* exsert.

Purple. 4. July—August. Mountains. 1-2 feet.

6. P. VIRGINICUM. *Stem* erect, pubescent, branching. *Flowers* in terminal heads. *Leaves* sessile, linear-lanceolate, entire, dotted. *Bracts* villous, acuminate. *Calyx* villous. *Corolla* pubescent on the outer surface.

White spotted. 4. July—August. Damp lands. 2-3 feet.

7. P. LINIFOLIUM. *Stem* erect, glabrous, fastigiately branched. *Leaves* usually clustered, linear entire, dotted, acute. *Flowers* in terminal heads, corymbose. *Bracts* ovate, awned, ciliate. *Corolla* pubescent.

White, spotted. 4 July—August. Mountains. 2-3 feet.

8 P MUTICUM. *Stem* erect, branching. *Leaves* lanceolate, sessile, slightly dentate, glabrous, dotted. *Flowers* in loose heads. *Bracts* rather short, acute. *Calyx* with acute segments, ciliate. *Corolla* pubescent, small.

Whitish. 4 July—August. Upper districts of Car. Ga. 1-2 feet.

9 P VERTICILLATUM. *Stem* erect, branching, pubescent when young.—*Leaves* ovate-lanceolate, pubescent, some of them dentate. *Flowers* in whorls. *Bracts* villous, acuminate. *Calyx* dotted.

White, dotted. 4 July—August. Mountains. 1-2 feet.

GENUS IV. HYSSOPUS.

Lower lip of the Corolla 3-parted, middle lobe sub-crenate. *Stamens* straight, distant, long. *Style* longer than the corolla.

1 H SCHROPHULARIFOLIUS. *Stem* herbaceous, pubescent towards the summit, glabrous below. *Leaves* cordate, and ovate-lanceolate, acuminate petioles pubescent. *Flowers* in crowded whorls, forming spikes. *Bracts* ovate, acuminate.

Reddish. 4 July—September. Mountains. 2-3 feet.

GENUS V. TEUCRIUM.

Upper lip of the corolla short, 2-parted, the lower one 3-lobed, the middle lobe largest. *Stamens* projecting through the cleft of the upper lip.

1 T CANADENSE. *Stem* erect, furrowed, pubescent, somewhat jointed.—*Leaves* opposite, ovate-lanceolate, serrate, on short petioles, almost tomentose beneath. *Flowers* in whorled racemes. *Bracts* subulate longer than the calyx. *Calyx* pubescent, with the three upper segments broad, the 2 lower narrow. *Corolla* pubescent, the upper lips deeply divided. *Stigmas* 2.

Blue or reddish. 4 July—September. Damp soils common, 2-3 ft.

2 T VIRGINICUM. *Stem* pubescent, furrowed. *Leaves* ovate-oblong, serrate, those near the summit, nearly sessile. *Flowers* in verticillate racemes, crowded. *Bracts* as long as the calyx.

Blue or purple. 4 July—August. In wet grounds. 2-3 feet.

GENUS VI. TRICHOSTEMA.

Calyx resupinated, upper lip of the corolla falcate. *Stamens* very long incurved.

1 T Dichotoma. *Stem* erect, branching. *Leaves* ovate-lanceolate, broad pubescent, entire. *Flowers* in dichotomous panicles, solitary, in the divisions of the branches. *Calyx* hispid, ribbed, bilabiate. *Stamens* unequal. *Stigmas* 2.
Blue. ☺ July—September. Dry soils, very common. 2–3 feet.

2 T Linearis. *Stem* viscidly pubescent. *Leaves* linear, smooth, sessile, acute at each end, teeth of the calyx awned. *Stamens* very long.
Blue. ☺ June—September. Dry fields. 6–12 inches.

Genus VII. COLLINSONIA.

Calyx bi-labiate, upper lip 3-toothed, lower one bifid. *Corolla* unequal, lower lip with numerous capillary segments.—*Stamens* 2–4. *Seed* generally abortive except 1.

1 C Canadense. *Stem* 4-angled, smooth. *Leaves* broad cordate, ovate, glabrous, teeth of the calyx subulate. *Flowers* large, in a compound terminal panicle. *Horse balm. Heal all. Stone root. Knot root.*

2 C Scabra. *Stem* furrowed, pubescent towards the summit, glabrous at the base. *Leaves* rugose, pubescent, ovate, slightly cordate, obtuse on short petioles. *Flowers* in terminal racemes. *Calyx* pubescent, with lanceolate segments. *Corolla* pubescent, the lower lip fimbriate.
Yellow and purple. Sept.—Oct. In the low country. 2–3 feet.

3 C Ovalis. *Stem* glabrous. *Leaves* oblong-oval, glabrous, acute, on long petioles. *Flowers* in simple terminal panicles, teeth of the calyx short. *Corolla* small.
Yellow. ♃ July—August. Middle Carolina.

4 C Tuberosa. *Stem* somewhat pubescent, branching. *Leaves* large, rhomboid-oval, glabrous, serrate, on long petioles, except the upper ones.
Yellow. ♃ Aug.—Sept. Rich soils. 3–4 ft.

5 C Punctata. *Stem* erect, scabrous, pubescent, branching at the summit. *Leaves* ovate-lanceolate, large, acuminate, dentate, pubescent and dotted beneath, upper pair nearly sessile, ovate. *Flowers* in compound, paniculate racemes. *Calyx* with the lower lip longest, sprinkled with resinous dots. *Corolla* pubescent, upper segments short, lower one fimbriate; filaments 4, two upper ones sterile.
Yellow. ♃ Sept.—Oct. Rich soils, common. 2–4 ft.

6 C Verticillata. *Stem* erect, simple. *Leaves* verticillate, oval, acuminate. *Flowers* in a terminal, verticillate raceme.

Var. Purpurascens. *Flowers* purple, in a short panicle.
Yellow. ♃ May—July. Middle Georgia. 1–2 ft.

7 C Anisata. *Stem* erect, branching, pubescent; segments of the calyx linear. *Flowers* in a compound panicle, leafy, pubescent. *Stamens* 4.
Pale yellow. ♃ July—Sept. Mountains. 1–2 feet.

Genus VIII CERANTHERA.

Calyx bilabiate, the upper lip emarginate, the lower 2-cleft. *Corolla* double the length of the calyx, bi-labiate, the upper lip 2-lobed, the lower 3-parted. *Stamens* 4, distant, exserted. *Anthers* awned.

1 C Linearifolia. *Stem* erect, glabrous, branching. *Leaves* linear, dotted, sometimes clustered. *Flowers* in terminal racemes. *Calyx* striate, usually tinged with purple, minutely pubescent at the summit, dotted. *Corolla* with throat inflated. *Style* longer than the stamens, hispid.
Reddish, spotted with violet. ☺ Sept.—Oct. Near Culloden. 12–18 in

Genus IX MONARDA.

Calyx 5-toothed, cylindric, striate. *Corolla* ringent, with the tube long, cylindric, upper lip linear, entire, the lower one reflexed, 3-lobed, middle lobe longest. *Stamens* 2. *Seed* 4.

1 M Clinopodia. *Stem* glabrous, obtuse, angled. *Leaves* ovate-lanceolate, tapering at the base, serrate near the middle, smooth, or slightly hairy, whitish beneath. *Flowers* in simple terminal heads. *Bracts* broad-ovate, acute, entire, nearly glabrous. *Calyx* short, ciliate. *Corolla* slender, pubescent.
Pale purple. ♃ July—Sept. Mountains. Dry soils. 2–3 ft.

2 M Punctata. *Stem* erect, branched, nearly glabrous, obtuse, angled, whitish. *Leaves* oblong, lanceolate, remote and obscurely serrate, tapering at the base, smooth. *Flowers* in whorls. *Bracts* lanceolate, colored, longer than the whorl. *Calyx* long. *Corolla* hairy, dotted with brown, the upper lip slightly arched, longer than the lower. *Horse mint*.
Yellow. ♂ Dry, pine barrens. Common. 3–5 feet.

3. M. Ciliata. *Stem* acutely angled, hirsute. *Leaves* pubescent, ovate, finely serrate, tapering. *Flowers* in whorls. *Bracts* strongly veined. *Calyx* hairy. *Corolla* small.
Blue. ♃ July—Sept. Mountains.

Genus X LEONURUS.

Calyx 5-angled, with 5 acute, expanding teeth. *Corolla* bilabiate, the upper lip entire, hairy; the lower 3-parted, reflexed. *Stamens* 4. *Anthers* sprinkled with shining dots.

1 L Cardiaca. *Stem* with 4 pubescent angles. *Leaves* pubescent, the lower ones 3-lobed, lanceolate, the upper ones entire, pale beneath, sometimes dentate, on petioles about 1 inch long. *Flowers* in numerous, axillary whorls. *Calyx* nearly glabrous. *Corolla* small, villous on the outer surface.
Mother wort.
White, tinged with red. ♂ or ♃ May—Aug. In rich soils. Introduced

Genus XI LAMIUM.

Calyx tubular, hairy, with 5-cleft, expanding border. *Corolla* bilabiate, the upper lip vaulted, the lower lip 2-lobed, toothed at the base. *Anthers* hairy.

1 L Amplexicaule. *Stem* pubescent, square, branching at the base. *Leaves* pubescent, broadly-cordate, crenate, the upper ones sessile, clasping, the lower ones on short petioles. *Flowers* on axillary whorls. *Calyx* hairy. *Corolla* with the tube long, marked with pale spots.
Bright purple. ☺ Common. 6–8 inches.

Genus XII DRACOCEPHALUM.

Calyx 5-cleft, with the segments nearly equal. *Corolla* with the throat inflated, the upper lip concave. *Stamens* 4.

1 D Virginianum. *Stem* erect, glabrous, or pubescent near the summit, square. *Leaves* opposite, linear lanceolate, sessile, acutely serrate. *Flowers* in terminal spikes, crowded. *Bracts* small, subulate, pubescent. *Calyx* pubescent, with short segments. *Corolla* large.
Bright purple. ♃ June—July. Mountain meadows. 2–3 ft.

2 D VARIEGATUM. *Stem* glabrous, square, with cartilaginous angles. *Leaves* sessile, oblong-lanceolate, toothed towards the summit, glabrous, lower ones alternate at the base. *Flowers* in short spikes. *Bracts* ovate, pubescent. *Calyx* pubescent. *Corolla* pubescent, inflated, the upper lip large, the middle segments of the lower lip streaked.

Bright purple. 4 May—June. Wet soils. 2–3 ft.

3 D DENTICULATUM. *Stem* glabrous, or minutely pubescent at the summit. *Leaves* sessile, ovate-lanceolate, glabrous, slightly toothed. *Flowers* in long spikes. *Bracts* subulate, finely pubescent. *Calyx* with the teeth nearly equal, pubescent. Lower lip of the *corolla* variegated.

Purple. 4 June—July. Mountains. 10–12 in.

4 D OBOVATUM. *Stem* erect, pubescent at the summit, glabrous below. *Leaves* obovate, sessile, cuneate, toothed at the summit. *Flowers* in short spikes. *Bracts* very small, pubescent. *Calyx* and *Corolla* pubescent.

Purple. 4 May—July. Southern Georgia. 12–15 in.

GENUS XIII STACHYS.

Calyx 5 cleft, segments awned, Upper lip of the *corolla* vaulted, lower lip 3-lobed, with the lateral lobes reflexed, the middle lobe large, emarginate. *Stamens* 4.

1 S HYSSOPIFOLIA. *Stem* erect, generally glabrous, slender, usually simple *Leaves* sessile, linear-lanceolate, remotely dentate, or finely serrulate. *Flowers* sessile, about 4 in a whorl. *Calyx* glabrous, with the teeth rigid. *Corolla* slightly pubescent on the inside.

Purple. 4 June—Aug. Wet, pine lands. 12–18 in.

2 S HISPIDA. *Stem* erect, pubescent, hispid, with the bristles usually retrorse. *Leaves* on short petioles, ovate, oblong, acute, serrulate, hispid; the upper ones nearly linear. *Flowers* 4–6 in a whorl. *Calyx* hairy; segments acute. Lower lip of the corolla whitish with dark spots.

Yellowish purple. 4 August—Sept. Pine barrens. 1–2 ft.

3 S ASPERA *Stem* erect, square, retrorsely hispid. *Leaves* sessile, linear lanceolate, serrulate, glabrous. *Flowers* usually 6 in a whorl. Teeth of the calyx divaricate, spiny.

Purple 4 June—Aug. Pine barrens. 1–2 ft.

GENUS XIV NEPETA.

Calyx tubular, ribbed, 5-toothed, with the teeth nearly equal. *Corolla* with the upper lip slightly emarginate, straight, the lower one 3-lobed, the middle lobe crenate. *Stamens* approximate.

1 N CATARIA. *Stem* pubescent. *Leaves* on petioles, cordate, serrate, pubescent, hoary beneath. *Flowers* in verticillate spikes. Upper tooth of the calyx longest. *Corolla* small, with lateral lobes reflexed. *Catnip.*

Nearly white. 4 June—Aug. Common around buildings. 1–3 ft.

Remarks.—This plant is very frequently employed as a family medicine, in poultices as an external application and internally in colic in children. It is agreeable, and is said to be efficacious.

GENUS XV. MARRUBIUM.

Calyx with 10 ribs, with 5 or 10 spreading teeth. *Corolla* with the upper lip bifid, linear, straight, the lower lip 3-cleft, the middle segment largest, emarginate. *Stamens* 4.

1 M Vulgare. *Stem* erect, branching at the base, tomentose. *Flowers* numerous, in whorls. *Leaves* roundish, ovate, rugose, dentate, tomentose beneath. *Calyx* with 10 setaceous teeth. *Corolla* small. *White Horehound.*
White ♃ Through the summer. Common around buildings.

Remarks.—This plant is a tonic, and in large doses cathartic. It is decidedly a family medicine, and is used in the incipient stages of coughs and catarrhs with good effects. It also derives celebrity from being extensively used in manufacturing the Horehound candy.

Genus XVI MACBRIDEA.

Calyx turbinate, striate, 3-cleft, 2 of the segments large, the other narrow. *Corolla* bilabiate, the upper lip entire, the lower one 3-lobed. *Anthers* villous, fringed.

1 M Pulchra. *Stem* erect, simple, glabrous, pubescent at the joints. *Leaves* lanceolate, serrulate, slightly hairy on the upper surface, ciliate; the upper ones sessile, the lower ones on short petioles. *Flowers* in a whorl, bracteate *Corolla* with the lateral lobes obtuse, reflexed.
White and purple. ♃ August—Sept. Pine barrens. 1–2 ft.

Genus XVII HEDEOMA.

Calyx bilabiate, the upper lip with 2 subulate, ciliate segments; the lower lip 3-cleft, segments lanceolate. *Corolla* ringent. *Stamens* 2.

1 H Pulegioides. *Stem* pubescent, angular. *Leaves* lanceolate, serrate, pubescent. *Flowers* on axillary peduncles, verticillate. *Calyx* hairy.
Squaw Mint. Wild Penny Royal.
Pale purple. ☺ July—Aug. Sandy soils. 6–10.

Remarks.—This plant is an aromatic stimulant, and like many of the plants of this Order is used much in family practice. It is taken in hot infusion for producing perspiration.

Genus XVIII CALAMINTHA.

Calyx tubular, ribbed, glabrous, throat closed with hair after flowering. *Corolla* pubescent, with the throat inflated, the upper lip emarginate, erect, the lower one 3-parted, with the segments obtuse, nearly equal. *Stamens* 4.

1 C Grandiflora. *Stem* slightly pubescent, terete. *Leaves* ovate, obtuse, slightly toothed, glabrous. *Flowers* in opposite, dichotomous clusters. *Stamens* shorter than the corolla. *Anthers* crescent shaped.
Rose color spotted with purple. ♃ June—Aug. Middle Car. & Ga.

Genus XIX PRUNELLA.

Calyx with unequal lips, the upper one truncate, 3-toothed. *Upper* lip of the corolla dilated. *Filament* forked at the extremity one point bearing another. *Stigma* bifid. *Stamens* 4.

1 P Vulgaris. *Stem* square, pubescent along the angles, hairy at the summit, branching at the base. *Leaves* oblong ovate, denticulate at the base, on long hairy petioles *Flowers* in compact spikes, axillary and terminal. *Bracts* ciliate. *Calyx* somewhat hairy, upper one 3-awned. *Corolla* with the upper lip emarginate. *Self heal, or healall.*
Violet. ♃ May—July. Common. 6–8 in.

Genus XX SCUTELLARIA.

Calyx bi-labiate, upper lip with a lid closing the calyx after flowering. *Corolla* bi-labiate, upper lip concave, lower 3-lobed, tube long. *Stamens* 4.

1 S Integrifolia. *Stem* 4-angled, usually branching, pubescent, lower leaves ovate, attenuate at the base, crenate, on short petioles; upper ones linear lanceolate, obtuse, sessile. *Flowers* in panicles composed of opposite racemes. A *Bract* at the base of each peduncle. *Corolla* villous, spotted with white. *Anthers* hairy.

Blue. 4 May—Aug. In damp soils, common. 2–3 ft.

2 S Canoliniana. *Stem* erect, branching, glabrous. *Leaves* linear-lanceolate, entire, acute, petiolate. *Flowers* in leafy, loose racemes. *Calyx* with the segments obtuse.

Blue. 4 May—June. In thick woods. Middle Car. & Ga. 1–2 ft.

3 S Serrata. *Stem* erect, pubescent, branching. *Leaves* oval, or ovate, acuminate, serrate, on short petioles. *Flowers* in terminal racemes. *Bracts* lanceolate. *Stamens* shorter than the corolla.

Blue. 4 June—Sept. In fields. 2–3 ft.

4 S Villosa. *Stem* erect, villous, branching. *Leaves* lanceolate, villous along the veins beneath, on short petioles. *Flowers* in racemose panicles. *Bracts* lanceolate.

Blue. 4 May—July. Middle Ga. 2–3 ft.

5. S. Pilosa. Stem erect, hairy, tinged with purple. Lower leaves cordate, obtuse; upper ones ovate, all rugose, crenate, hairy and dotted on the under surface, on short petioles. *Flowers* in paniculate racemes. *Calyx* hispid. *Corolla* hispid on the outer surface.

White, tinged with violet. 4 May—July. Fertile soils. 1–2 ft.

6 S Cordifolia. *Stem* erect, pubescent. *Leaves* cordate, acute, obtusely toothed, on long petioles, pubescent. *Flowers* in opposite and terminal racemes. *Calyx* villous.

White and blue. July—Aug. Car. & Ga. 2–3 ft.

7 S Laterifiora. *Stem* erect, glabrous, with the angles sometimes pubescent, much branched. *Leaves* ovate serrate, acuminate, lower ones on rather long petioles; the upper nearly sessile. *Flowers* in leafy racemes. *Calyx* glabrous.

Blue. 4 June—Sept. Upper Car. and Ga.

Genus XXI SALVIA.

Calyx somewhat campanulate, 2-lipped, upper lip 3-toothed, the lower bifid. *Corolla* ringent. *Stamens* 2. *Filaments* bifid with the connectivum elongated, bearing an anther cell at each extremity.

1 S Lyrata. *Stem* square, hirsute, branching at the summit, retrorsely pubescent. *Radical* leaves terete, dentate, hirsute, spotted, upper leaves lanceolate, slightly dentate, few. *Flowers* usually 6 in a whorl. *Calyx* angled, hirsute. *Corolla* hairy on the outside. *Cancer-weed.*

Blue. 4 March—Sept. Common. 2–3 ft.

2 S Claytoni. *Stem* erect, square. *Leaves* cordate-ovate, sinuate, dentate, rugose, pubescent on the veins. *Flowers* 6 in a whorl. *Calyx* hispid along the veins.

Violet. 4 June—Oct. Common. 8–12 in.

3 S Urticifolia. *Stem* erect, villous, somewhat viscous. *Leaves* ovate, doubly serrate, acuminate, attenuate at the base, pubescent. *Flowers* in remote whorls, viscous. *Calyx* pubescent.

Blue. ♃ June—July. Upper districts Car. & Ga. 12–15 in.

4 S Coccinea. *Stem* erect much branched. *Leaves* cordate, serrate, tomentose, on rather long petioles. *Flowers* 6 in a whorl; upper lip of the corolla erect, emarginate, connectivum, bearing the anther only at one extremity. *Scarlet-sage.*

Red. ♃ Through the summer. On the sea-coast. 1–2 ft.

5 S Azurea. *Stem* much branched. *Leaves* linear, glabrous. *Flowers* in distant whorls. *Calyx* pubescent, 3-cleft.

Blue. ♃ Through the Summer. Middle and upper Car. & Ga. 4–6 ft

6 S Obovata. *Stem* erect, slightly angled. *Leaves* very large, obovate, dentate, pubescent. *Flowers* 6 in a whorl.

Blue ♃ June—July. Middle Ga. 1–2 ft.

Genus XXII HYPTIS.

Calyx 5-toothed, tubular. *Corolla* ringent, the upper lip 2-cleft, the lower 3-parted, the middle segment forming a small sack. *Stamens* 4, inserted into the tube.

1 H Radiata. *Stem* erect, square, pubescent. *Leaves* sessile, pubescent, tapering at the base, dentate. *Flowers* in axillary heads, on long peduncles. *Involucre* about 12 leaved. *Calyx* pubescent, 5-toothed, teeth linear.

White, tinged with purple. ♃ July—Sept. Damp soils, common. 3–4 ft.

Order LXXXI. VERBENACEÆ.

Calyx tubular, persistent inferior. *Corolla* hypogynous, usually with an irregular limb. *Stamens* 4, didynamous, sometimes only 2. *Ovary* 2–4 celled. *Ovules* erect, or pendulous, solitary or twin. *Style* 1. *Fruit* a drupe or berry. *Albumen* none. Generally herbaceous plants, with exstipulate leaves.

Genus I VERBENA.

Calyx 5-cleft. *Corolla* funnel form, with the tube curved, and the limb unequally 5-cleft. *Stamens* 4, didynamous. *Seeds* 4. *Flowers* in paniculate spikes.

1 V Aubletia. *Stem* creeping, assurgent, angled, pubescent. *Leaves* opposite, oval-lanceolate, 3-lobed, dentate. *Flowers* in terminal spikes. *Calyx* angled, with unequal setaceous segments. *Corolla* pubescent at the summit, the border expanding.

Purple. ♃ Through the Summer. Pine barrens common.

2. V. Spuria. *Stem* decumbent, divaricately branched. *Leaves* sessile, deeply laciniate, somewhat pinnatifid; segments serrate. *Flowers* in filiform spikes, loose. *Bracts* longer than the calyx.

Purple. ☉ August—Oct. Middle Ga. 1–2 ft.

3 V Hastata. *Stem* erect, pubescent. *Leaves* lanceolate, acuminate, serrate, the lower ones frequently lobed, or hastate. *Flowers* in short, linear spikes, paniculate. *Bracts* ovate, shorter than the calyx.

Purple. ♃ July. Aug. Middle Car. Ga. 2–4 ft.

4. V. Paniculata. *Stem* erect, scabrous, almost hispid. *Leaves* long lanceolate, coarsely serrate, undivided. *Flowers* in numerous spikes, forming a corymbose panicle.

Purple. ♃ July—Aug. Mountains. 4–6 ft.

5 V URTICIFOLIA. *Stem* erect, somewhat pubescent, with numerous slender branches. *Leaves* ovate, acute, serrate. *Flowers* in filiform spikes, axillary and terminal, forming panicles. *Bracts* subulate; segments of the corolla nearly equal.

White, tinged with purple. July—Aug. Common. 2–3 ft.

6 V CAROLINIANA. *Stem* erect, scabrous, simple, viscid. *Leaves* oblong, obovate, irregularly serrate, sometimes slightly lobed. *Flowers* in long spikes. *Bracts* subulate. *Corolla* somewhat bilabiate.

Pale purple. May—July. Dry soils, common.

GENUS II CALLICARPA.

Calyx small, persistent, 4-cleft. *Corolla* 4-cleft, with obtuse segments. *Fruit* baccate, 4-celled, juicy, purple.

1 C AMERICANA. A shrub bearing many branches, the old wood glabrous, young branches tomentose. *Leaves* opposite, lanceolate, serrate, tomentose beneath; petioles sprinkled with resinous atoms. *Flowers* in axillary clusters, on very short peduncles. *Calyx* tomentose *French Mulberry.*

Purple. ½ May—July. Very common. 3–5 ft.

GENUS III ZAPANIA.

Calyx 5toothed. *Corolla* 5-lobed. *Stamens* 4-didynamous. *Stigma* capitate, peltate, oblique. *Seeds* 2, covered at first by an evanescent pericarp. *Flowers* in heads.

1 Z NUDIFLORA. *Stem* procumbent, branching, somewhat scabrous, herbaceous. *Leaves* ovate, cuneate, serrate towards the apex, on short petioles. *Flowers* on axillary peduncles in small heads. *Bracts* broad, purple along the margin. *Stamens* short. *Seeds* 2.

Bluish white. ♃ July—Aug. Damp soils common. 4–6 in.

2 Z LANCEOLATA. *Stem* herbaceous, creeping, similar to the preceding. *Leaves* linear-lanceolate, serrate. *Flowers* on long peduncles, in conical heads.

Bluish white. ♃ July—Aug. Banks of streams. 6–8 in.

GENUS IV LANTANA.

Calyx obtusely 4-toothed. *Corolla* with the limb 4-cleft. *Stamens* 4, didynamous. *Stigma* hooked. *Fruit* a drupe, dark blue, containing a smooth 2-celled nut. *Flowers* in heads.

1 L CAMARA. A shrub with the stems rough, square. *Leaves* opposite, ovate-lanceolate, scabrous, pubescent along the veins, serrate. *Flowers* on axillary peduncles, numerous. *Bracts* longer than the calyx. *Stamens* short. *Drupes* globular.

Bright yellow. ½ June—Nov. Southern Ga. and Florida. 2–4 ft.

ORDER LXXXII. BIGNONIACEÆ.

Calyx divided. *Corolla* hypogynous, usually irregularly 4–5 lobed. *Stamens* 5, 1 or 3 sterile. *Ovary* 2-celled, or spuriously 4-celled, many seeded. *Style* 1. *Capsule* 1–2-

celled. *Seed* compressed, usually winged. *Albumen* none. Trees or climbing plants. *Leaves* without stipules.

Genus I BIGNONIA.

Calyx 5-cleft, cup-shaped, coriaceous. *Corolla* campanulate, 5-lobed, ventricose beneath. *Stamens* 4-didynamous. *Pod* 2-celled. *Seed* with membranaceous wings.

1 B Capreolata. A vine, climbing over small trees and shrubs. *Leaves* connate, lanceolate, cordate, glabrous, bearing tendrils, peduncles axillary, each one flowered.
Dull red. ♄ March—April. Common.

2 B Radicans. A vine, climbing over the loftiest trees, attaching itself by radicles. *Leaves* pinnate; leaflets ovate, toothed, acuminate, glabrous on the upper surface, pubescent beneath. *Flowers* in corymbs. *Corolla* slightly ventricose beneath, tinged with yellow on the inside, with the segments nearly round, with a barren filament.
Red. ♄ June—September. Common.

Genus II CATALPA.

Calyx 2-parted. *Corolla* campanulate, with the tube ventricose, border with 4-unequal lobes. *Stamens* 2-fertile and 2–3-sterile. *Stigma* in 2 plaits. *Capsule* cylindrical, 2-celled, 2-valved. *Seed* with membranaceous margins.

1 C Cordifolia. A tree, with long, opposite, expanding branches. *Leaves* nearly round, cordate acuminate, glabrous on the upper surface, downy beneath, very large, usually 3 in a whorl. *Flowers* in large, terminal panicles, segments of the calyx ob-ovate, concave, those of the corolla crenulate, with the tube variegated, with yellow and purple; silique long, with the dissepiment opposite the valves.
White. ♄ April—May. Common on the Ocmulgee. 20–50 feet.

Order LXXXIII. PEDALINEÆ.

Calyx 5-cleft. *Corolla* hypogynous, bi-labiate, with the limb 5-lobed. *Stamens* 4, didynamous. *Ovary* spuriously 4-celled. *Style* 1. *Stigma* divided. *Fruit* a ligneous capsule, terminated by a hooked beak. *Seed* few, large, pendulous. Herbaceous plants, with alternate leaves, and axillary flowers.

Genus I MARTYNIA.

Genus the same as the order.

1 M Proboscideæ. *Stem* procumbent, branching, fistulous, viscidly pubescent, whole plant fœtid. *Flowers* on axillary peduncles. *Calyx* split to the base on the under side. *Capsule* ligneous, 2 valved, 4-celled, with the surface furrowed, with 2-curved beaks, 2–3 inches long.
Dull yellow. ☺ June—August. Common.

Order LXXXIV. SCROPHULARINEÆ.

Calyx divided, unequal, persistent. *Corolla* bilabiate, hy-

pogynous. *Stamens* usually 4, didynamous, sometimes only 2. *Ovary* 2-celled. *Style* 1. *Stigma* 2-lobed. *Fruit* generally a 2-celled capsule. *Placenta* central. *Seed* usually numerous, small. Herbaceous plants, with the leaves generally opposite.

Genus I VERONICA.

Calyx 4, rarely 5-parted. *Corolla* 4-lobed, unequal; the lower segments narrowest. *Stamens* 2. *Capsule* 2-celled, obcordate. *Seed* few.

(*a*) *Flowers terminal, in spikes.*

1 V Virginica. *Stem* erect, glabrous, slightly angled. *Leaves* verticillate, by fours or fives, lanceolate, acute, serrate, pubescent beneath. *Flowers* in long, axillary spikes. *Corolla* tubular. *Style* long, persistent.
White. 4 June—Aug. Mountains. 2–3 feet.

2 V Officinalis. *Stem* procumbent, spreading, rough. *Leaves* hirsute, scabrous, nearly round. *Flowers* in axillary, solitary spikes.
Pale blue. ☺ April—June. Damp soils. 6–10 in.

3 V Serpyllifolia. *Stem* decumbent, sometimes creeping, pubescent, slightly angled. *Leaves* ovate, on short petioles, decussate, glabrous, crenate. *Flowers* in terminal, leafy racemes. *Capsule* emarginate.
Pale blue. 4 May—June.

4 V Arvensis. *Stem* procumbent, hairy. *Leaves* cordate, alternate, on short petioles, notched. *Flowers* solitary, axillary, on hairy peduncles. *Calyx* deeply parted. *Seeds* 8 in a cell.
Blue. ☺ Jan.—April. Common in the low country.

5 V Anagallis. *Stem* succulent, erect. *Leaves* lanceolate, serrate, varying in width. *Flowers* in long, opposite racemes.
Blue. 4 May—June. In damp places. 1–2 ft

6 V Arvalensis. *Stem* procumbent, hairy, with assurgent branches. *Leaves* opposite, cordate-ovate, on short petioles, slightly dentate; the upper ones usually sessile, lanceolate. *Flowers* axillary, solitary, on short peduncles *Corolla* shorter than the calyx. *Stamens* short.
Pale blue. ☺ May—June. Damp soils, common.

7 V Peregrina. *Stem* erect, terete, glabrous, frequently simple. Lower leaves opposite, oblong, toothed; the upper alternate, linear, lanceolate. *Flowers* solitary, axillary. *Corolla* shorter than the calyx. *Stamens* very short.
White. ☽ Feb.—March. Wet lands. Very common. 6–8 in.

Genus II BUCHNERA.

Calyx cylindrical, 5-toothed. *Corolla* tubular, a little curved, with the border equally 5-cleft: segments obcordate. *Stamens* 4 didynamous. *Capsule* 5-celled.

1 B Americana. *Stem* simple, terete, scabrous and hairy. *Leaves* lanceolate, sessile, opposite, dentate. *Flowers* in spikes. *Calyx* slightly curved, bracteate, upper lip 3-cleft, the lower bifid. *Corolla* pubescent. *Stamens* short.
Purple. 4 Through the summer. Damp soils, common. 1–2 ft.

Genus III SCROPHULARIA.

Calyx campanulate, 5-cleft, with equal segments. *Corolla*

with the tube globose, the border 5-cleft. *Stamens* 4, didynamous. *Capsule* 2-celled, many seeded.

1 S Marilandica. *Stem* erect, angled, glabrous, much branched. *Leaves* opposite, cordate, ovate, lanceolate, serrate. *Petioles* ciliate. *Flowers* in compound, terminal panicles. *Corolla* twice as long as the calyx ; the 4 upper segments erect, the lower one reflexed.
Greenish, tinged with purple. ♃ Aug.—Oct. Rich soils. 2–4 ft.

Genus IV ANTIRRHENUM.

Calyx gibbous at the base, deeply 5-parted, with lanceolate, pubescent segments. *Corolla* ringent, with a short tube bearing a spur. *Capsule* 2-celled, 2-valved.

1 A Canadense. *Stem* assurgent, glabrous, simple. *Leaves* scattered, erect, linear, dotted, alternate on the fertile branches, verticillate on the sterile. *Calyx* pubescent. The spur of the corolla long, subulate. *Seeds* angled,
Blue. ♃ March—April Common. 12–18 inches.

Genus V MIMULUS.

Calyx prismatic, 5-toothed. *Corolla* ringent, with the upper lip reflexed at the sides ; palate of the lower lip prominent. *Stamens* 4 didynamous. *Stigma* thick, bifid. *Capsule* 2-celled, many seeded. *Seeds* minute.

1 M Ringens. *Stem* erect, glabrous, 4-angled. *Leaves* opposite, sessile, narrow, lanceolate, acuminate, serrate, glabrous. *Flowers* axillary on peduncles about the length of the leaves ; segments of the calyx subulate ; lower lip of the corolla 3 lobed, larger than the upper. *Seeds* numerous, small.
Pale blue. ♃ July—Sept.

2 M Alatus. *Stem* erect, glabrous, square, slightly winged. *Leaves* ovate, lanceolate, serrate, on short petioles. *Flowers* axillary, on short peduncles ; segments of the calyx mucronate. *Corolla* tinged with yellow.
Pale blue. ♃ August—Sept. Pine barrens. 1–2 ft.

Genus VI LINDERNIA.

Calyx pubescent, 5-leaved. *Corolla* bilabiate, 4-cleft ; the upper lip short, reflected, emarginate ; the lower lip 3-cleft, with the segments oval, obtuse. *Stamens* 4, the two longest sterile. *Capsule* 2-valved, 2-celled, many seeded.

1 L Dilatata. *Stem* procumbent, smooth, square. *Leaves* oblong, ovate, amplexicaule, sparingly toothed. *Flowers* axillary, on square peduncles, covered with glandular hairs. *Corolla* resupinate. *Stigma* compressed.
Pale purple. ☺ May—Sept. Around ponds. 6–8 in.

2 L Attenuata. *Stem* procumbent, or erect, square, glabrous. *Leaves* lanceolate, and obovate, narrowed at the base. *Flowers* on erect peduncles, shorter than the leaves, axillary, solitary.
Purple. ☺ May—June. Wet places. 6–8 in.

Genus VII SCHWALBEA.

Calyx tubular, ventricose, obliquely 4-cleft, upper segment

small; lower large, emarginate. *Corolla* bilabiate, ringent; the upper lip arched, entire, the lower 3-lobed. *Capsule* ovate, 2-celled, 2-valved. *Seed* numerous, winged.

1 S Americana. *Stem* pubescent, angled, simple. *Leaves* alternate, lanceolate, entire, sessile. *Flowers* in terminal racemes, nearly sessile. *Bracts* 2, as long as the calyx.
Dull purple. ♃ May—June. Pine barrens.

Genus VIII CHELONE.

Calyx 5-parted, with 3 bracts. *Corolla* ringent, ventricose. *Stamens* 4, with a fifth sterile filament shorter than the rest. *Anthers* woolly. *Capsule* 2-celled, 2-valved, many seeded. *Seeds* with a membranaceous margin.

1 C Glabra. *Stem* angled, rooting at the joints, glabrous. *Leaves* usually opposite, oblong-lanceolate, acuminate, serrate, glabrous, nearly sessile. *Flowers* in terminal spikes. *Bracts* shorter than the calyx. *Calyx* with the segments obtuse. *Corolla* with the lower lip bearded.
White. ♃ July—Aug. In wet shady places. 2–3 ft.

Genus IX PENTSTEMON.

Calyx 5-leaved, bilabiate, ventricose. *Stamens* 4, with a fifth sterile filament, bearded on the upper side, and longer than the others. *Anthers* smooth. *Capsule* ovate, 2-celled, 2-valved. *Seed* numerous.

1 P Lævigatum. *Stem* glabrous, or slightly pubescent, terete. *Leaves* ovate, oblong; those of the root lanceolate, acute, upper ones slightly denticulate. *Flowers* in terminal panicles. *Calyx* hairy. *Corolla* pubescent, upper lip 2-cleft, with the segments reflected; the lower 3-cleft.
Pale purple. ♃ June—Sept. Fertile soils. 1–2 ft.

2 P Pubescens. *Stem* pubescent, erect. *Leaves* sessile, lanceolate, oblong, serrulate, amplexicaule, pubescent. *Flowers* in terminal panicles.
Pale purple. ♃ May—Sept. In dry soils. 1–2 ft.

3 P Dissectum. *Stem* erect, slightly pubescent. *Leaves* opposite, glabrous, compoundly dissected, with the segments irregular, linear. *Flowers* in panicles, with the flowers at the summit of the branches.
Purple. ♃ June—July. Middle Georgia. 1–2 feet.

Genus X HERPESTIS.

Calyx 5-cleft, unequal. *Corolla* tubular, somewhat bilabiate. *Stamens* 4 didynamous, included. *Capsule* 2-celled, 2-valved, with the dissepiment parallel to the valves.

1 H Cuneifolia. *Stem* prostrate, branching, glabrous, succulent. *Leaves* opposite, cuneate, obovate, obscurely crenate towards the summit, sessile. *Flowers* on axillary peduncles about as long as the leaves; the three exterior segments of the *calyx* broad, the two narrow, with 2 bracts at the base. *Corolla* nearly campanulate, with a 5-cleft border; segments nearly equal.
Pale purple. ♃ May—Oct. Inundated lands.

2 H Rotundifolia. *Stem* procumbent, assurgent, pubescent. *Leaves* oval, nearly orbicular, slightly hairy, amplexicaule. *Flowers* on opposite pe-

duncles. The 3 outer leaves of the *calyx* large, the 2 interior small and subulate. *Anthers* sagittate.

Blue. ♃ July—Sept. Along the margin of ponds.

3 H Amplexicaulis. *Stem* procumbent, woolly. *Leaves* cordate, amplexicaule, entire. *Flowers* on opposite peduncles, shorter than the leaves, larger than the preceding species.

Blue. ♃ July—Sept. Wet, pine barrens. Mid. Car. & Ga.

4 H Micrantha. *Stem* prostrate, glabrous, succulent. *Leaves* sessile, ovate, obtuse, entire, glabrous. *Flowers* on axillary peduncles, shorter than the leaves.

White. ♃ Sept.—Oct. On the margins of rivers.

Genus XI GERARDIA.

Calyx 5-toothed. *Corolla* sub-campanulate, unequally 5-lobed; segments rounded. *Stamens* 4 didynamous. *Capsule* 2-celled, dehiscing at the summit.

1 G Aphylla. *Stem* erect, naked, nearly simple, with opposite, ovate scales, sometimes a few minute *leaves*. *Calyx* small, 5-toothed. *Corolla* small, longer than the peduncle. *Capsule* ovate.

Purple. ☺ June—July. Along the sea coast. 2–3 ft.

2 G Plukenetii. *Stem* erect, much branched, slightly angled. *Leaves* small, setaceous, glabrous. *Flowers* numerous, axillary and terminal, on peduncles shorter than the leaves. *Calyx* with 5 minute teeth. *Corolla* pubescent. *Capsule* globose.

Purple. ♃ Aug.—Oct. Common in wet lands.

3 G Setacea. *Stem* erect, much branched, glabrous, slender. *Leaves* setaceous, glabrous. *Flowers* axillary and terminal, on leafy branches. *Calyx* truncate, with small, subulate teeth. *Corolla* hairy, the border nearly equally 5-cleft, ciliate, with the tube white.

Purple. ☺ Aug.—Sept. Damp lands. 1–2 ft.

4 G Fasciculata. *Stem* erect, scabrous, marked with lines, branching at the summit. *Leaves* opposite and by threes, sometimes alternate, linear, acute, clustered. *Flowers* large, on peduncles shorter than the leaves. *Calyx* truncate, with small, subulate teeth. *Corolla* with the upper segments reflexed, villous, the three lower pubescent, ciliate.

Purple, spotted with red. ☺ Aug.—Oct. Common in the low country

5 G Filifolia. *Stem* erect, terete, branching. *Leaves* filiform, glabrous, alternate, in axillary clusters; segments of the calyx acutely toothed. *Flowers* on peduncles longer than the leaves. *Corolla* with the throat pubescent, ventricose.

Purple. ☺ Aug.—Oct. Southern Georgia.

6 G Purpurea. *Stem* erect, much branched, scabrous. *Leaves* linear-acute, scabrous. *Flowers* nearly sessile, large. *Calyx* with short, subulate teeth. *Corolla* pubescent.

Purple. ☺ Aug.—Sept. Damp soils, common.

7 G Tenuifolia. *Stem* diffuse, much branched, glabrous, angled. *Leaves* linear, acute, glabrous, except on the margins. *Flowers* on peduncles shorter than the leaves. *Calyx* with minute teeth. *Corolla* pubescent, ventricose, with the segments ciliate, with the tube nearly white.

Purple. ☺ Aug.—Oct. Dry, sandy soils. Common in Mid. Ga.

8 G Linifolia. *Stem* erect, slender, with erect, virgate branches. *Leaves* linear, appressed to the stem. *Flowers* on peduncles shorter than the leaves, which become elongated. *Calyx* truncate, with 5 minute teeth.

Purple. ♃ Aug.—Sept. Damp, pine barrens.

9 G Flava. *Stem* pubescent, sparingly branched, or simple, pubescent. Lower leaves lanceolate, sometimes deeply serrate, on short petioles, upper

ones entire, or slightly dentate. *Flowers* axillary, opposite, on very short peduncles. *Calyx* with subulate segments.

Yellow. 4 July—Sept. Upper district Car. & Ga. 2–3 feet.

10 G QUERCIFOLIA. *Stem* erect, branching, obtusely angled, purple. Upper leaves lanceolate, scabrous; lower leaves pinnatifid, with acute, toothed segments. *Flowers* axillary, on short peduncles. *Calyx* pubescent. *Corolla* pubescent on the inner surface, ventricose. *Anthers* hairy.

Yellow. 4 May—Sept. Rich soils, common.

11 G PEDICULARIA. *Stem* erect, branching from the base, purple, viscid, densely pubescent. *Leaves* oblong, sessile, irregularly dissected, serrate.—*Flowers* axillary, on short peduncles; segments of the calyx foliaceous. *Corolla* villous.

Yellow. ☺ July—Sept. Pine barrens, common.

GENUS XII SEYMERIA.

Calyx deeply 5-cleft. *Corolla* campanulate, equally 5-cleft. *Stamens* 4, inserted into the throat of the corolla. *Capsule* ovate, ventricose, 2-celled, 2-valved, many seeded, dehiscing at the summit.

1 S TENUIFOLIA. *Stem* erect, glabrous, much branched, rough. *Leaves* opposite, sessile, compoundly pinnatifid, with filiform segments. *Flowers* axillary, on rather short peduncles. *Calyx* with subulate segments. *Corolla* with short tube, pubescent.

Yellow and purple. ☺ Aug.—Sept. Low country. 3–4 ft.

2 S PECTINATA. *Stem* much branched, viscidly pubescent, obtusely angled. Lower leaves pectinately pinnatifid, with the segments linear, entire; upper ones smaller, and often entire. *Flowers* on axillary peduncles. *Corolla* with a short tube.

Yellow. ☺ Aug.—Sept. Middle Georgia. 2–4 feet.

ORDER LXXXIV. OROBANCHEÆ.

Calyx divided, persistent. *Corolla* hypogynous, persistent. *Stamens* 4 didynamous. *Ovary* superior, with parietal placentæ. *Style* 1. *Stigma* 2-lobed. *Fruit* a capsule, 1-celled, 2-valved, with one or two placentæ in the middle of the valves. *Seed* numerous, minute. Herbaceous, parasitic plants.—*Leaves* brown, or colorless scales.

GENUS I OROBANCHE.

Calyx 4–5-cleft, segments unequal. *Corolla* ringent. *Capsule* ovate, 1-celled. *Seed* numerous, with a gland beneath the base of the germ.

1 O AMERICANA. *Stem* simple, thick, covered with ovate-lanceolate scales. *Flowers* in spikes, terminal. *Corolla* recurved. *Stamens* exserted. *Cancer-root.*

Brownish yellow. 4 July—Aug. Rich soils. 6–8 in.

2 O UNIFLORA. *Stem* erect, short, numerous from each root, covered with smooth, concave scales. *Scape* 1-flowered, 4–6 inches long, pubescent.—*Corolla* with oblong, oval lobes, with a pubescent margin.

Bluish white. 4 May—July. Pine barrens.

Genus II EPIPHAGUS.

Calyx short, 5-toothed. *Flowers* polygamous, the upper ones sterile, the lower fertile. *Corolla* of the sterile florets ringent, compressed, 4-cleft; of the fertile 4-toothed, small. *Capsule* truncate, oblique, 1-celled.

1 E Virginica. *Stem* erect, branching, covered with small, ovate scales. *Flowers* alternate, small, sterile flowers largest, striped with purple, growing on the roots of Beach trees.
White, with purple. ♃ August—September. 12–18 inches.

Order LXXXV. ACANTHACEÆ.

Calyx 4–5-cleft, persistent, with the segments equal or unequal. *Corolla* hypogynous, with a regular or irregular border. *Stamens* inserted into the tube of the corolla, 2 or 4, when 4 didynamous, the short ones sometimes sterile. *Ovary* 2-celled, surrounded at the base by a disk. *Style* 1. *Capsule* 2-celled, few or many seeded; dissepiments opposite the valves. *Seeds* suspended, nearly globular. *Cotyledons* large. Herbaceous plants, with opposite, simple leaves.

Genus I JUSTICIA.

Calyx 5-parted, often with 2 bracts at the base. *Corolla* bilabiate, the upper lip emarginate, the lower 3-cleft. *Stamens* 2. *Stigma* 1. *Capsule* 2-celled, 2-valved.

1 J Humilis. *Stem* assurgent, glabrous towards the base, rough near the summit, jointed. *Leaves* decussate, lanceolate, serrulate, scabrous. *Flowers* in long axillary spikes. *Bracts* minute. *Calyx* persistent, ventricose. *Corolla* with the upper lip reflected; middle segment of the lower lip longest, spotted.
Violet. ♃ May—June. In wet soils. 12–18 in.

2 J Ensiformis. *Stem* assurgent. *Leaves* decussate, linear-lanceolate, glabrous, acute, slightly oblique. *Flowers* in short, compact spikes, on long peduncles.
Violet. ♃ May—June. Southern Georgia.

Genus II RUELLIA.

Calyx 5-parted, often with 2 bracts. *Corolla* campanulate, with a 5-lobed border. *Stamens* 4 or 5 approximate. *Capsule* attenuate, dehiscing at the summit.

1 R Strepens. *Stem* erect, 4-angled, hairy. *Leaves* opposite, petiolate, lanceolate-ovate, entire. *Flowers* axillary, 1–3 in each axil. *Calyx* with acute hispid segments, with 2 bracteal leaves as long as the calyx. *Corolla* with the segments rounded; tube longer than the calyx. *Seed* generally 4.
Blue. ♃ May—Sept. Damp soils. 1–2 ft.

2 R Hirsuta. *Stem* erect, obtusely angled, sparingly branched, hirsute. *Leaves* opposite, ovate-lanceolate, sessile, acute, rough. *Calyx* with hispid subulate segments, longer than the tube of the corolla. *Style* long.
Blue. ♃ July—Oct. Ga. and Ala.

3 R Ciliosa. *Stem* erect, branching. *Leaves* ovate-oblong, ciliate, hairy along the veins. *Bracts* short, segments of the calyx subulate, short.
Blue. 4 July—Sept. Southern Ga. 1-2 ft.

4 R Oblongifolia. *Stem* erect, obtusely angled, branched or simple, pubescent. *Leaves* sessile, obovate, obtuse; lower leaves nearly round. *Calyx* with the segments filiform, as long as the tube of the corolla, hispid; segments of the corolla emarginate. *Capsule* surrounded with a glandular ring. *Seed* few.
Blue, spotted with yellow. 4 May—Sept. Very common. 1-2 ft.

5 R Hemistrata. *Stem* diffuse, glabrous. *Leaves* on long petioles, obtuse oval. *Flowers* nearly sessile. *Capsule* linear.
Blue. 4 May—Sept. Sandy pine barrens. Southern Ga.

Genus 3 ELYTRARIA.

Calyx 4–5-parted, with the front segment bifid. *Corolla* 5-cleft, with the segments nearly equal. *Stamens* 2, with 2 barren filaments. *Capsule* 2-celled, 2-valved, few seeds in each cell.

1 E Virgata. *Stem* none. *Leaves* long, entire, lanceolate, cuneate at the base, scabrous on the upper surface, slightly undulate; scape covered with ovate, amplexicaule scales. *Flowers* in dense spikes. *Bracts* enclosing the flowers rigid; scales 2 at the base of the calyx, pubescent. *Calyx* pubescent
4 May—June. Damp pine barrens. 1-2 ft.

Order LXXXVI. GENTIANEÆ.

Calyx 5–10-cleft, persistent. *Corolla* hypogynous, usually regular, limb with as many lobes as the calyx. *Stamens* inserted into the corolla, and alternate with the segments, and equal to them in number. *Ovary* 1–2-celled, 1–2-seeded. *Style* 1. *Fruit* capsular, 1-celled. *Seed* small. Herbaceous plants, with opposite exstipulate leaves.

Genus I GENTIANA.

Calyx 4–5-cleft. *Corolla* tubular, campanulate, 4–5-cleft, with the orifice naked. *Stamens* 4–5, included. *Stigmas* 2. *Capsule* 1-celled, 2-valved.

1 G Saponaria. *Stem* erect, simple, terete, glabrous. *Leaves* ovate-lanceolate, acute, glabrous. *Flowers* axillary, terminal, sessile, clustered. *Calyx* with short segments. *Corolla* with the border 5 cleft, with the segments acute; the inner segments unequally 2-cleft. *Soap Gentian.*
Bright blue. Sept—Oct. Upper districts of Car & Ga. 1-2 ft.

2 G Catesbæi. *Stem* erect, simple, slightly pubescent, rough. *Leaves* narrow, lanceolate, scabrous. *Flowers* axillary, 1-3 in an axil. *Calyx* with the segments 2-3 times as long as the tube; border of the corolla erect, or expanding. *Anthers* sagittate. *Seed* compressed, slightly winged.
Blue. 4 October. In damp places. Low country. Car. & Ga.

3 G Ochroleuca. *Stem* simple, terete, glabrous. *Leaves* lanceolate, entire, glabrous, of the margins scabrous; segments of the calyx foliaceous, linear-lanceolate. *Flowers* opposite, sometimes clustered, on very short pedunches; border of the calyx connivant, the interior segments short, dentate. *Sampson Snake-root.*
White, striped with green and purple. 4 Sept.—Oct. Damp soils. 10–15 in

4 G ANGUSTIFOLIA. *Stem* simple, slender, glabrous. *Leaves* linear, cuneate. *Flowers* terminal. *Corolla* large, of the segments expanding, the middle ones shorter and lacerate.
Blue, tinged with purple. ♃ Wet places. Oct.—Nov. 12–18 in.

5 G CRINITA. *Stem* erect terete at the base. angled towards the summit, glabrous. *Leaves* sessile, with scabrous margins, acute. *Flowers* solitary, axillary, and terminal, on rather long peduncles; segments fimbriate.
Pale blue. ♃ Oct.—Nov. Mountains. 1–2 ft.

6 G QUINQUEFLORA. *Stem* erect, branching, glabrous, angled, and slightly winged. *Leaves* sessile, ovate-lanceolate, amplexicaule, acute. *Flowers* usually terminal, generally from 3–5. *Corolla* with the segments undulate.
Blue. ♃ Among the mountains.

7 G ACUTA. *Stem* erect, angular. *Leaves* oblong, acute, amplexicaule. *Flowers* in terminal and lateral clusters; throat of the corolla ciliate; segments linear-lanceolate.
Blue. ♃ Mountains.

GENUS II FRASERA.

Calyx 4-parted, with the segments lanceolate. *Corolla* 4-parted, with a paracorolla in the center of each segment. *Capsule* 1-celled, 2-valved. *Seed* compressed, winged, eliptical.

1 F WALTERI. *Stem* erect, angled, branching, furrowed. *Leaves* verticillate or opposite, glabrous; the lower ones lanceolate-oblong, long; the upper ones narrower, small. *Flowers* verticillate; segments of the corolla, lanceolate. *Stamens* 4. *Stigmas* 2. *Wild Columbo.*
Red and Yellow. ♂ July—Aug. Middle Car. 6–8 ft.

GENUS III SABBATIA.

Calyx 5-12-parted, persistent. *Corolla* rotate, 5–12-parted. *Stamens* 5. *Stigmas* 2, spiral. *Capsule* 1-celled, 2-valved.

1 S PANICULATA. *Stem* erect, much branched, marked by a decurrent line. *Leaves* linear-lanceolate. *Flowers* in diffuse panicles; segments of the calyx setaceous. *Corolla* with the segments lanceolate.
White. ♃ July—Oct. Pine barrens, common.

2 S CORYMBOSA. *Stem* erect, branches near the summit, opposite, quadrangular. *Leaves* ovate, sessile. *Flowers* in corymbs. *Corolla* usually 6-parted, much longer than the calyx. *Stamens* usually 6.
White. ♃ June July. Wet pine barrens.

3 S GRACILIS. *Stem* erect, slightly furrowed. *Leaves* lanceolate, opposite, sessile; upper ones linear. *Flowers* in corymbs. *Calyx* turbinate, with linear segments. *Corolla* with obtuse obovate segments. *Stamens* 5. *Style* short.
Red and yellow. ☉ July—Sept. On the sea coast. 12–18 in.

4 S BRACHIATA. *Stem* erect, slightly angled, with brachiate branches. *Leaves* lanceolate. *Flowers* in panicles, generally 3 at the extremity of each branch; segments of the calyx linear-lanceolate, those of the corolla obovate.
Red. ♃ June—Aug. Middle Car. & Ga. 1–2 ft.

5 S ANGULARIS. *Stem* erect, angled, winged, glabrous, with opposite, brachiate branches. *Leaves* cordate-ovate, ternate, amplexicaule. *Calyx* angled, with subulate segments. *Corolla* with 5 obovate segments. *Stamens* 5.
Red. ♃ July—Aug. In rich soils. 1–2 ft.

6 S Calycosa. *Stem* slightly angled, sparingly branched, or simple.—*Leaves* sessile, oval, obtuse. *Flowers* terminal, frequently solitary. *Calyx* usually 10-parted, with the segments leafy. *Corolla* 7–10 parted, with lanceolate segments.

Red. ♃? June—Sept. In rich and wet soils. 1–2 ft.

7 S Ciliolata. *Stem* erect, slender, branching. *Leaves* lanceolate, erect; segments of the Calyx 7–12-parted, linear, shorter than the corolla. *Corolla* 8–12-parted, with the segments lanceolate.

Red. ♃? July—Sept. Around ponds.

8 S Gentianoides. *Stem* erect, slightly angled. *Leaves* linear, acute, long. *Flowers* axillary and terminal, the terminal ones crowded. *Calyx* campanulate, 8–10-parted, with the segments subulate. *Corolla* 8–10-parted, with obovate segments. *Stamens* short.

Red. ♃? Aug.—Sept Middle Georgia.

Remarks. We have found several varieties of this genus without being able to determine to which species they belong, and we have only given those species which are well characterised, leaving it for future investigation to arrange the genus more satisfactorily.

Genus IV CENTAURELLA.

Calyx 4-cleft, persistent, glabrous. *Corolla* campanulate, persistent, 4-cleft. *Stamens* 4, inserted into the tube of the corolla, short. *Capsule* 1-celled, 2-valved, many seeded.

1 C Verna. *Stem* simple, angular, glabrous. *Leaves* few, resembling scales. *Flowers* terminal, 1–3. *Calyx* with lanceolate, expanding segments. *Style* persistent. *Stigma* 2-cleft.

White. ☾ Feb.—April. On the sea coast of Ga. 4–8 in.

2 C Paniculata. *Stem* smooth, with brachiate branches. *Leaves* minute, subulate, those of the base alternate, those towards the summit opposite. *Flowers* in panicles, on opposite peduncles, the lower ones branched. *Calyx* 4-cleft, the two outer decurrent. *Corolla* about the length of the calyx.

Greenish white. ☉ Aug.—Sept. In ditches and damp grounds. 8–12 in.

Genus V HOUSTONIA.

Calyx 4-cleft. *Corolla* funnel shaped, 4-cleft. *Stamens* 4. *Stigma* simple. *Capsule* half superior, 2-valved, 2-celled, many seeded, dehiscing transversely.

1 H Patens. *Stem* erect, square, glabrous, with expanding branches deficient. *Leaves* opposite, spatulate-lanceolate, ciliate. *Flowers* solitary, terminal, or axillary, 2 scales in the middle of the peduncle. *Calyx* with linear segments, persistent. *Capsule* compressed.

White. ☉ Feb.—March. Common. 1–2 in.

2 H Caerulea. *Stem* erect, slender, square, sparingly branched. *Leaves* of the root, spatulate, those of the stem lanceolate. *Flowers* on axillary, long peduncles, each one flowered.

White. ♃ May—Aug. Common in mid. Car. & Ga. 4–6 in.

3 H Longifolia. *Stem* erect, square, branching, glabrous. *Leaves* sessile, lanceolate, attenuate. *Flowers* in corymbs, on very short peduncles.

Purple. ♃ June—Aug. Mid. & upper dis. 8–16 in.

4 H Purpurea. *Stem* erect, much branched, glabrous, hairy at the joints, and with the angles ciliate. *Leaves* sessile, ovate-lanceolate, obtuse at the base: nerves pubescent. *Flowers* in terminal corymbs. *Calyx* pubescent, with ciliate segments.

Purple. ♃ June—Aug. Abundant on the Ocmulgee, near Macon. 10–15 inches.

5 H Serpyllifolia. *Stem* procumbent, cespitose, filiform. *Leaves* spatulate, obtuse. *Flowers* on terminal peduncles, each 1-flowered.

6 H Rotundifolia. *Stem* prostrate, rooting at the joints, glabrous. *Leaves* ovate, narrowed at the base, slightly ciliate. *Flowers* on axillary peduncles, each one flowered. *Corolla* salver form, pubescent within; tube long; segments lanceolate. *Capsule* emarginate.
White. ♃ Through the summer. On the sea coast.

Genus VI POLYPREMUM.

Calyx 4-parted, persistent. *Corolla* rotate, 4-cleft, with the throat hairy. *Stamens* 4, very short. *Style* 1, slender. *Capsule* compressed, 2-celled.

1 P Procumbens. *Stem* procumbent, furrowed, dichotomously branched. *Leaves* sessile, linear, opposite, connected by a stipular membrane. *Flowers* terminal, and in the divisions of the branches sessile, 2–4 leafy bracts at the base of the calyx; segments of the calyx subulate, serrulate. *Seed* angular.
White. ♃ May—Sept. Very common. 6–12 inches.

Genus VII VILLARSIA.

Calyx 5-parted. *Corolla* rotate, with the limb 5-parted, ciliate. *Stamens* 5. *Style* 1. *Stigma* 2-lobed, glands 5, alternating with the stamens. *Capsule* 1-celled, 2-valved, many seeded.

1 V Lacunosa. *Stem* filiform, floating. *Leaves* reniform, lacunose beneath, slightly crenate, on long petioles. *Flowers* somewhat umbelate, arising from the petioles.
White. ♃ July—August. In still waters.

Genus VIII OBOLARIA.

Calyx 2-parted, in the form of bracts. *Corolla* campanulate, 4-cleft; segments equal, entire or crenulate. *Stamens* 4, somewhat didynamous. *Stigma* 2-cleft. *Capsule* 1-celled, 2-valved, many seeded.

1 O Virginica. *Stem* cespitose, simple, or sparingly branched, glabrous. *Leaves* opposite, sessile, obovate, slightly decurrent, glabrous. *Flowers* 2–3 on the summit of axillary branches.
White or red. ♃. April—May. In rich soils. 4–6 inches.

Order LXXXVII. SPIGELIACEÆ.

Calyx 5-parted. *Corolla* hypogynous, tubular 5-lobed.—*Stamens* 5, inserted into the corolla. *Ovary* superior, 2-celled. *Style* articulated. *Stigma* simple. *Fruit* capsular, 2-celled, 2-valved, dehiscing elastically. *Placentæ* central. *Albumen* abundant. *Embryo* minute. *Herbaceous* plants with opposite entire leaves. *Flowers* in secund spikes.

Genus I. SPIGELIA.

Genus same as the Order.

1 S MARILANDICA. *Stem* square, branching at the base, slightly winged. *Leaves* sessile, ovate-lanceolate margins, and veins pubescent beneath.—*Flowers* in a simple terminal, secund spike, segments of the calyx subulate, tube of the corolla ventricose, long, yellow within, segments short.

Deep red. 4. May—July. Dry soils, very common. 1-2 feet.
Carolina Pink, or Pink root.

Remarks.—The root of this plant is much used in both the regular and domestic practice, as a vermifuge, or in cases of worms. It should always be employed in connexion with some cathartic medicine, since it acts as a narcotic, if not carried from the system, either by its own action or that of some other agent.

ORDER LXXXVIII. APOCYNEÆ.

Calyx persistent 5-cleft. *Corolla* hypogynous, 5-lobed, regular, æstivation twisted. *Stamens* 5, inserted into the corolla, alternate with its lobes. *Ovaries* 2, or 1–2 celled, many seeded. *Style* 1–2 or wanting. *Stigma* 1. *Fruit*, usually a follicle, double or single, or a capsule. *Seed* numerous. *Plants* usually with a milky juice. *Leaves* entire.

GENUS I APOCYNUM.

Calyx minute, 5-cleft, persistent. *Corolla* campanulate, with the limb divided into 5 short, spreading or revolute lobes, the base furnished with 5 glandular teeth, alternating with the stamens. *Stamens* 5. *Anthers* sagitate. *Style* wanting.—*Follicles* 2, long, distinct.

1 A ANDROSÆMIFOLIUM. *Stem* erect, with spreading branches. *Leaves* ovate, glabrous. *Flowers* in terminal and lateral cymes. *Tube* of the corolla longer than the calyx. *Dog's bane.*

White tinged with red. 4. June—July. Common. 3–5 feet.

2 A CANNABINUM. *Stem* erect, branched. *Leaves* lanceolate, acute on short petioles, glabrous. *Flowers* in paniculate cymes. *Calyx* about as long as the tube of the corolla. *Indian hemp.*

Greenish white. 4 June—July. Common.

3 A PUBESCENS. *Stem* erect. *Leaves* ovate, oblong, on short petioles, mucronate. *Flowers* in short pubescent cymes, tube of the corolla, longer than than the calyx.

Greenish white. 4 June—July. Common. 2–3 feet.

GENUS II. AMSONIA.

Calyx 5-parted. *Corolla* funnel shaped, with the throat closed. *Follicles* 2-erect. *Seed* terete with the summit obliquely truncate.

1 A LATIFOLIA. *Stem* erect, glabrous. *Leaves* oval-lanceolate, on short petioles, alternate; upper ones acuminate, pubescent along the veins beneath. *Flowers* in terminal corymbose panicles. *Follicles* linear, long.

Pale blue. 4 April—May. Very common. Middle Car. & Ga.

2 A SALICIFOLIA *Stem* erect, smooth, growing in bunches. *Leaves* linear lanceolate, acute, glabrous. *Flowers* in terminal corymbs, numerous.—*Follicles* long slender.

Pale blue. May—June. Abundant near Macon. 1-2 feet.

3 A ANGUSTIFOLIA. *Stem* erect, pubescent, branching. *Leaves* linear-

lanceolate, numerous, pubescent, erect, those of the branches linear, ciliate. *Follicles* long slender.

Blue. ♃ April—May. Middle Car. & Ga. Abundant.

Genus III. ECHITES.

Calyx 5-parted, with acute segments. *Corolla* funnel shaped, the border 5-parted, the throat naked. *Anthers* adhering to the stigma. *Follicles* 2, distinct, long, slender.

1 E Difformis. *Stem* climbing over small shrubs. *Leaves* opposite, pubescent, beneath, the lower ones narrow lanceolate or linear, the upper oval-lanceolate, acuminate. *Flowers* in corymbose racemes. *Stamens* included, inserted into the base of the corolla.

Yellowish white. ♃ May—Aug. Damp rich roils.

Genus IV. GELSEMINUM.

Calyx 5-leaved. *Corolla* funnel shaped with the border 5-lobed. *Capsule* compressed 2-celled. *Seed* flat.

1 G Sempervirens. *Stem* twining, smooth, glabrous. *Leaves* opposite, lanceolate, entire, perennial, shining on the upper surface, paler beneath.—*Flowers* in axillary clusters, on short peduncles, which are covered with small scales. *Leaves* of the calyx equal, glabrous. *Capsule* oblong, furrowed, terminated by the style. *Yellow Jessamine.*

Yellow. ♄ Feb.—March.

Order LXXXIX. ASCLEPIADEÆ

Calyx 5-cleft, persistent. *Corolla* hypogynous, 5-lobed, æstivation twisted. *Stamens* 5; filaments connate. *Anthers* 2-celled. *Pollen* in masses, adhering to the processes of the stigma. *Ovaries* 2. *Styles* 2. *Stigma* 1, dilated, with 5 processes; placentæ attached to the suture. *Follicles* 1 or 2. *Seeds* numerous, imbricate, comose. *Plants* with a milky juice, somtimes twining.

Genus I. ASCLEPIAS.

Calyx small 5 parted. *Corolla* reflexed, 5-parted. *Staminal* crown 5-leaved; leaflets opposite the anthers, each producing from its base, a subulate averted process. *Stigma* with 5-angles. *Pollen* in 10 masses, arranged in pairs. *Follicles* 2. *Seeds* comose.

1 A Variegata. *Stem* erect, simple, terete, with 2 pubescent lines.—*Leaves* opposite oval-lanceolate, undulate glabrous beneath; veins and margins pubescent. *Flowers* in terminal umbels, with the peduncles and pedicles pubescent, with a caducous bract at the base of each pedicel. *Calyx* hairy, reflexed, with subulate segments. *Corolla* glabrous, green on the outer surface; follicle lanceolate, smooth.

White. ♃ April—June. In rich soils. Common. 2–3 feet.

2 A Phytolaccoides. *Stem* erect, simple. *Leaves* opposite, broad lan-

ovulate, large, acuminate, smooth, pale beneath. *Flowers* in lateral and terminal umbels, nodding.

Greenish purple. ♃ June—July. Mountains 2–4 feet.

3 A Quadrifolia. *Stem* erect, simple, smooth. *Leaves* verticillate by fours, ovate-lanceolate, glabrous, acuminate on short petioles. *Flowers* in terminal and axillary umbles; pedicels capillary; nectaries with horns, 2-toothed.

White. ♃ June—July. Dry woods. 2–3 feet.

4 A Connivens. *Stem* erect, terete, glabrous. *Leaves* opposite, sessile, oblong, oval, sprinkled with hair. *Flowers* few, in umbels, large; nectaries with horns.

White. ♃ June—July. Southern Georgia. 1–2 feet.

5 A Incarnata. *Stem* erect, branching, tomentose. *Leaves* opposite, lanceolate, long, somewhat tomentose, pubescent along the veins and margins. *Flowers* in numerous umbels, generally in pairs. *Nectaries* with subulate, exsert horns.

Purple. ♃ July—Aug. On the banks of streams. 2–4 ft.

6 A Tomentosa. *Stem* erect, tomentose when young. *Leaves* opposite, tomentose on the under surface, acuminate. *Flowers* in terminal umbels, simple. Horns of the *nectaries* exserted.

Southern Ga

7 A Obovata. *Stem* erect, tomentose, terete. *Leaves* opposite, nearly sessile, obovate, obtuse, mucronate, tomentose on the under surface; the upper ones smaller and lanceolate. *Flowers* in terminal and axillary umbels, nearly sessile.

Middle Ga. 2–3 ft.

8 A Obtusifolia. *Stem* simple, erect, purple. *Leaves* sessile, opposite, cordate, ovate, undulate, glabrous, glaucous beneath. *Flowers* in terminal umbels, usually solitary, on long peduncles. *Corolla* large, tinged with purple and green. Horns of the *nectary* exserted.

Purple and white. ♃ June—July. Sandy soils. 2–3 ft.

9 A Amplexicaulis. *Stem* decumbent, terete. *Leaves* large, succulent, sessile, opposite, cordate, strongly veined. *Flowers* in axillary and terminal umbels. Horns of the nectary exserted.

Dull white. ♃ April—May. Dry sandy soils. 1–2 ft.

10 A Purpurascens. *Stem* erect, simple. *Leaves* ovate, nearly sessile, nearly glabrous above, downy beneath; purple in drib. *Flowers* in erect, terminal umbels. Horns of the nectary resupinate.

Purple. ♃ June—July. In swamps. 3–4 ft.

11 A Lanceolata. *Stem* erect, glabrous, marked by a decurrent hairy line. *Leaves* sessile, opposite, ovate, tapering at the summit, glabrous. *Flowers* in axillary and terminal umbels: peduncles long. *Corolla* green on the outer surface.

Purple. ♃ June—July. Damp pine barrens. 2 ft.

12 A Pauvercula. *Stem* erect, glabrous, marked by a decurrent, hairy line. *Leaves* opposite, linear lanceolate, long, glabrous, margins pubescent. *Flowers* in umbels, on long peduncles.

Bright purple. ♃ May—July. Damp sandy soils. 3–4 ft.

13 Parviflora. *Stem* erect and decumbent, slightly pubescent. *Leaves* opposite, lanceolate, acuminate, tapering at the base, slightly pubescent, silky on the upper surface, on short petioles. *Flowers* in axillary and terminal umbels. Horns of the nectary long.

White. ♃ May—Aug. 1–2 ft.

14 A Verticillata. *Stem* erect, slender. *Leaves* hairy, linear, crowded at the base, verticillate in the middle, opposite towards the summit of the stem. *Flowers* in axillary and terminal umbels. Horns of the nectary exserted.

Dull white. ♃ May—Aug. In rich soils. 2–3 ft.

15 A Cinerea. *Stem* erect, slender. *Leaves* long, linear opposite, glab-

rous; upper ones minute. *Flowers* in terminal umbels. Horns of the nectary exserted.

Dull white, variegated. ♃ June—July. Pine barrens. 2–3 ft.

16 A Angustifolia. *Stem* pubescent, terete. *Leaves* alternate, slightly pubescent, long, strap shaped. *Flowers* in terminal umbels. Horns of the nectary included.

Dull white. ♃ May—June. Pine barrens. 8–16 in.

17 A Tuberosa. *Stem* erect, and decumbent, hirsute, branching towards the summit. *Leaves* alternate, crowded, sessile or on short petioles. *Flowers* numerous in umbels. *Pleurisy root. Butterfly weed.*

Orange. ♃ Sandy soils.

Remarks.—The root of the *A. Tuberosa* is highly esteemed throughout the Southern States as a valuable remedial agent. It is a diaphoretic, and expectorant, and is employed in all affections of the lungs, dysentary, rheumatism, and pleurisy, and it is said with great benefit in all of these cases.

Genus II GONOLOBIUS.

Calyx small. *Corolla* rotate, 5-parted. *Staminial* crown, shield-form, lobed. *Stamens* 5. *Anthers* opening transversely. *Pollen* masses 10, in 5 pairs. *Stigma* flattened. *Follicles* 2, ventricose. *Seed* comose.

1 G Macrophyllus. *Stem* climbing over small shrubs, pubescent. *Leaves* opposite, broad-cordate, acuminate, pubescent. *Flowers* in axillary umbels; segments of the corolla obtuse; follicles murcate.

Obscure yellow. ♃ June—Aug. Light soils.

2 G Carolinensis. *Stem* climbing, pubescent. *Leaves* oblong, cordate, acuminate, slightly auriculate, pubescent. *Flowers* in axillary umbels; segments of the corolla long, obtuse; follicles ribbed, angular.

Purple. ♃ May—Aug. Clay soils.

3 G Prostratus. *Stem* prostrate, branching at the base, lower leaves reniform; upper ones cordate, all pubescent, and ciliate *Flowers* in axillary umbels; segments of the corolla ovate; follicles oval, glabrous.

Purple. ♃.

Order XC. OLEACEÆ.

Flowers perfect, or diœcious. *Calyx* divided, persistent. *Corolla* hypogynous, 4-cleft. *Stamens* 2, alternate with the segments of the corolla. *Ovary* simple, 2-celled, 2 seeds in a cell. *Style* 1. *Stigma* simple, or bifid. *Fruit* usually a drupe, often 1-seeded by abortion; cotyledons foliaceous. Trees or shrubs, with opposite leaves.

Genus I OLEA.

Flowers diœcious. *Calyx* small, 4-toothed. *Corolla* with a short tube; limb 4-cleft; segments ovate. *Fruit* a drupe 1-seeded.

1 O Americana. A small tree. *Leaves* opposite, lanceolate, eliptic, coriaceous, shining, perennial. *Flowers* in paniculate racemes, with persistent bracts.

White, fragrant. ♄ April—May. Near the sea coast. 10–20.

Genus II CHIONANTHUS.

Calyx minute, 4-cleft, persistent. *Corolla* 4-cleft, with long, linear, pendulous segments. *Fruit* a striated drupe.

1 C Virginica. A beautiful shrub. *Leaves* opposite, lanceolate, entire, shining when mature. *Flowers* in panicles, composed of opposite branches. *Fringe tree, or Old Man's Beard.*
White. ♄ April—May. Common. 6–10 ft.

Genus III FRAXINUS.

Flowers diœcious. *Calyx* none, or 3–4-cleft. *Corolla* none, or 4-petalled. *Stamens* 2. In the fertile florets, stamens none. *Pistil* 1. *Fruit* a 1-seeded samara, foliaceous at the extremity.

1 F Epiptera. A middle sized tree. *Leaves* unequally pinnate; leaflets 7–9, elliptic, lanceolate, acuminate, glabrous, slightly serrate. *Flowers* in axillary panicles. *Samara* cuneate, emarginate.
White. ♄ March—April. River swamps. 40–60 ft.

2 F Acuminata. A large tree. *Leaves* unequally pinnate; leaflets 7–9, oval-lanceolate, acuminate, lucid on the upper surface, usually entire. *Samara* with a long, lanceolate wing. *White ash.*
White. ♄ March—April. Swamps. 50–70 ft.

3 F Caroliniana. A small tree. *Leaflets* generally 7, lanceolate, slightly serrulate towards the apex, entire and attenuate at the base, glabrous, lucid on the upper surface. *Flowers* having a calyx.
White. ♄ April—May. In high lands.

4 F Platycarpa. A small tree. *Leaves* opposite; leaflets petiolate, oval-lanceolate, serrate, pubescent when young. *Samara* with a broad-lanceolate wing.
White. ♄ March—April. Swamps.

5 F Pubescens. A large tree. *Leaflets* 7–9, ovate-lanceolate, serrate, on short petioles, acuminate, pubescent beneath. *Samara* with an oblong-lanceolate wing.
♄ March—April. Swamps. 50–60 ft.

6 F Triptera. A small tree. *Leaflets* obovate, tomentose beneath, oblique at the base. *Fruit* unlike that of the other species of this genus, 3-winged, tapering at the base. *Seed* 3-sided.

Order XCI. BORAGINEÆ.

Calyx 5-cleft, persistent. *Corolla* hypogynous, regular, 5-cleft. *Stamens* inserted into the corolla, alternate with its segments. *Ovary* 4-lobed, 4-celled, with 4 suspended ovules. *Style* simple, arising from the base of the lobes. *Nuts* 4, distinct. Herbaceous plants, with alternate, scabrous leaves. *Flowers* in secund spikes or racemes.

Genus I LITHOSPERMUM.

Calyx 5-parted. *Corolla* funnel form, small, 5-lobed. *Stamens* included. Nuts shining.

1 L Arvense. *Stem* erect, hispid, branching. *Leaves* oblong-obtuse, or

ovate. *Flowers* solitary, axillary, forming leafy racemes. *Calyx* with long, linear, subulate segments. *Nuts* rugose. *Corn Gromwell*

White. ☉ April—May. Introduced. 12–18 in.

Genus II BATSCHIA.

Calyx 5-parted. *Corolla* salver form; tube straight, bearded at the base, open at the orifice; segments rounded.

1 B Gmelini. *Stem* erect, hirsute, simple. *Leaves* hispid, oblong, somewhat oval, those of the flowers ovate. *Calyx* with long lanceolate segments, persistent. *Corolla* with 5 tubucles in the throat. *Flowers* in terminal racemes.

Bright orange. ♃ April—May. Common. 10–16 in.

2 B Canescens. *Stem* villous, erect, simple *Leaves* oblong, mucronate, obtuse, villous beneath. *Flowers* axillary, crowded near the summit of the stem. *Calyx* with linear-lanceolate segments, short; tube of the corolla double the length of the calyx. *Puccoon.*

Bright orange. ♃ June—July. 8–12 inches.

Genus III CYNOGLOSSUM.

Calyx 5-parted. *Corolla* funnel form, with a short tube and 5-lobed border, orifice closed. *Seed* depressed, affixed to the style to their inner margin.

1 C Virginicum. *Stem* erect, hispid. *Leaves* large, oval, oblong, the upper ones amplexicaule, hairy. *Flowers* in terminal corymbs. *Hound's tongue.*

Blue. ♃ May—June. In shady woods. 1–2 feet.

Genus. IV ONOSMODIUM.

Calyx 5-parted, with acute, ciliate segments. *Corolla* campanulate, with a border 5-parted, ventricose. *Stamens* included. *Style* exserted. *Nuts* shining.

1 O Hispidum. *Stem* obtusely angled, hispid, branched. *Leaves* sessile, oblong-lanceolate, pubescent, entire. *Flowers* in simple racemes. *Calyx* hispid, ciliate. *Corolla* pubescent. *Seed* angled on the inner side.

Yellowish. ♃ May—June. Sandy soils, common. 12–18 in.

Genus V PULMONARIA.

Calyx small, 5-parted, persistent, prismatic. *Corolla* funnel form, obscurely 5-lobed.

1 P Virginica. *Stem* erect, glabrous, branching. *Leaves* lanceolate-ovate, glabrous, glaucous. *Flowers* in terminal fascicles. *Corolla* several times as long as the calyx. *Style* slender, as long as the stamens.

Violet color. ♃ April—May. Mountains. 1–2 feet.

Genus VI MYOSOTIS. (*Syn. Echinospermum.*)

Calyx 5-parted. *Corolla* 5-cleft, emarginate, salver-form, throat closed by connivant scales. *Nuts* fixed to a central column, echinate, compressed.

1 M VIRGINIANA. *Stem* branching, hairy. *Leaves* oblong-lanceolate, acuminate, scabr us above. *Flowers* in divaricate, dichotomous racemes. *Nuts* covered with hooked prickles.
Blue. ♂ June—July. Upper dist. Car. & Ga. 1-2 feet.

ORDER XCII. HELIOTROPICEÆ.

Calyx 5-parted, persistent. *Corolla* hypogynous 5-parted. *Stamens* 5, alternate with the segments of the corolla. *Ovary* entire, 4-celled, with a pendulous ovule in each cell. *Style* simple. *Fruit* drupaceous, easily separable into 4 pieces.—*Seed* solitary. *Herbaceous* plants with alternate simple leaves. *Flowers* in axillary or terminal spikes.

GENUS I. HELIOTROPIUM.

Genus same as the Order.

1 H INDICUM. *Stem* erect, hispid, furrowed. *Leaves* alternate, cordate, ovate, scabrous, acute, margins irregular. *Flowers* in axillary spikes. *Calyx* 5-parted, hirsute shorter than the corolla. *Fruit* angular, separating.
Blue. ○ June—Aug. Middle and Southern Car. & Ga. 8-12 feet.

2 H CURASSAVICUM. *Stem* erect, or decumbent, simple, or branched, succulent, glaucous. *Leaves* narrow, lanceolate, glabrous, succulent. *Flowers* in terminal spikes. *Calyx* succulent, as long as the tube of the corolla. *Corolla* salver form, furrowed. *Fruit* angled on the inside, coated with a fleshy pulp.
White tinged with yellow. ○ May—July. On the sea coast. 6-12 in.

ORDER XCIII. HYDROPHYLLEÆ.

Calyx 5-10-cleft, persistent. *Corolla* hypogynous, 5-lobed, with two lamellæ at the base of each lobe. *Stamens* 5, alternate with the segments of the corolla. *Ovary* simple, 1-celled. *Ovule* suspended. *Style* 1, bifid. *Placentæ* 2-parietal. *Fruit* capsular, enclosed in the permanent calyx. Few, or many seeded. Herbaceous plants, hispid.

GENUS I HYDROPHYLLUM.

Calyx 5-parted. *Corolla* campanulate, 5-cleft, with 5 longitudinal nectariferous grooves on the inside. *Stamens* 5, exserted. *Filaments* bearded. *Capsule* globose, 1-celled, 2-valved, usually 1-seeded.

1 H VIRGINICUM. *Stem* erect, nearly glabrous. *Leaves* pinnate, and pinnatifid: segments oval-lanceolate, serrate. *Flowers* in compact axillary clusters; segments of the calyx linear.
Blue. 4 May—June. In shady, rocky situations. 1-2 ft.

GENUS II PHACELIA.

Calyx 5-cleft. *Corolla* 5-cleft, sub-campanulate, with 5

nectariferous grooves on the inside. *Stamens* 5, exserted. *Style* filiform. *Stigmas* 2. *Capsule* 2-celled, 2-valved, 4-seeded.

1 P Fimbriata. *Stem* assurgent, hispid. *Leaves* pinnatifid, with undivided lobes. *Flowers* in simple, terminal racemes, revolute before flowering, afterwards erect; segments of the corolla fimbriate.
Blue. ♃ May—June. Common around Macon. 6–10 in.

Order XCIV. SOLANEÆ.

Calyx 4–5-parted, persistent. *Corolla* hypogynous 4–5-cleft. *Stamens* 5, inserted into the corolla, alternate with its segments, sometimes 1-abortive. *Ovary* 2-celled, with 2-polyspermous placentæ. *Stigma* simple. *Fruit* a capsule with 2–4 cells, and a double dissepiment, or a berry with the placentæ adhering to the dissepiment. *Seeds* numerous. *Embryo* curved. Herbaceous, or shrubby plants, with alternate leaves.

Genus I SOLANUM.

Calyx 5-cleft. *Corolla* rotate, 5-cleft. *Stamens* 5, connivant, dehiscing by 2 pores at the extremity. *Fruit* a subglobose berry, 2-celled.

1 S Nigrum. *Stem* erect, angled, glabrous, with the young branches pubescent, unarmed. *Leaves* ovate-angled, dentate, tapering at the base, on long petioles, sprinkled with hair. *Flowers* in 3–6-flowered umbels between the leaves. *Calyx* persistent, pubescent. *Corolla* pubescent, with acute segments. *Fruit* black, many seeded. *Night shade.*
White. ♃ Through the Summer. Damp soils, common.

2 S Mammosum. *Stem* prickly. *Leaves* cordate, angled, villous, lobed, very broad, villous and prickly on both sides. *Flowers* in loose terminal racemes and opposite. *Fruit* yellow, tapering at the base.
Yellow. ☉ June—Aug. Middle and Southern Ga.

3 S Virginianum. *Stem* erect, prickly, branches angled. *Leaves* pinnatifid, prickly, ciliate, segments obtuse. *Calyx* prickly. *Fruit* small, greenish white.
White. July—Aug. Sandy soils, common. 6–10 in.

4 S Carolinense. *Stem* erect, with numerous expanding branches, hairy, armed with stiff sharp prickles. *Leaves* ovate-lanceolate, hastate, scabrous, prickly, covered with stellular pubescence. *Flowers* in simple lateral racemes. *Calyx* pubescent, prickly. *Horse nettle.*
White. ♃ May—July. Very common. 1–2 ft.

Genus II PHYSALIS.

Calyx 5-cleft. *Corolla* rotate, 5-cleft. *Stamens* 5-connivant. *Berry* globose, 2-celled, enclosed in the inflated calyx.

1 P Lanceolata. *Stem* erect, densely pubescent, angled, somewhat branch-

ed. *Leaves* alternate, oval-lanceolate, entire, tomentose, on rather short petioles. *Flowers* solitary, nodding. *Calyx* truncate.
Yellow, with purple spots. ♃ June—Aug. Dry soils, common.

2 P Angulata. *Stem* erect, glabrous, branching, the branches angular. *Leaves* broad-ovate, dentate. *Flowers* axillary, on slender peduncles, becoming elongated. *Corolla* spotted at the base.
Yellow. ☉ Through the Summer. In the low country.

3 P Pennsylvanica. *Stem* slightly angled, pubescent. *Leaves* ovate, obtuse, slightly repand, tomentose on the under surface. *Flowers* on axilary solitary peduncles. *Fruit* red, small.
Yellow. ☉ June—Aug. Common. 10–12 in.

4 P Pruinosa. *Stem* prostrate, angled, divaricately branched, pubescent *Leaves* ovate, unequally dentate, pubescent several at each division of the stem, on long petioles. *Flowers* axillary, nodding. *Corolla* with 5 purple spots at the base. *Calyx* angled.
Yellow. ☉ May—June. Cultivated lands, common. 6–8 in.

5 A Viscosa. *Stem* erect, dichotomous, the young branches pubescent, and viscid. *Leaves* alternate and lanceolate, repand, dentate, viscid, on long petioles. *Flowers* solitary in the divisions of the stem. *Calyx* pubescent. *Corolla* pubescent, with villous spots at the base. *Ground cherry.*
Yellow. ☉ July—Oct. Cultivated lands, common. 1–2 ft.

6 P Pubescens. *Stem* much branched, hispid. *Leaves* broad-ovate, slightly cordate, irregularly dentate. *Flowers* solitary, nodding. *Calyx* tomentose.
Yellow. ☉ June—July. On the sea coast.

Genus III NICOTIANA.

Calyx urceolate, 5-cleft. *Corolla* funnel-form, 5-cleft, regular. *Stamens* 5. *Stigma* emarginate. *Capsule* 2-valved, many seeded.

1 N Tabacum. *Stem* erect, viscidly pubescent. *Leaves* ovate, entire, petiolate, very large. *Flowers* in terminal panicles and racemes, tube of the corolla cylindrical, much longer than the calyx. *Tobacco.*
White, tinged with pink. ☉ July—Aug. Introduced. 2–5 ft.

Genus IV DATURA.

Calyx large, tubular, ventricose, 5-angled. *Corolla* funnel-form, with a long tube, the limb 5-angled, plaited. *Stamens* 5. *Stigma* bilamellate. *Capsule* 2-celled, cells 2-parted, apparently 4-celled.

1 D Stramonium. *Stem* erect, branching, dichotomous. *Leaves* alternate, angled, sinuate, unequal at the base, on long petioles. *Flowers* solitary in the divisions of the stem. *Calyx* pubescent, with acute segments. *Fruit* spinous. *Thorn apple. Jamestown weed.*
Whitish purple. ☉ May—Sept. Very common.

Genus V LYCIUM.

Calyx 4-toothed, short. *Corolla* tubular. *Stamens* 4. *Filaments* bearded. *Fruit* a 2-celled, many seeded berry, red.

1 L Carolinianum. A small shrub, with long slender branches, unarmed. *Leaves* clustered, cuneate, glabrous, narrow. *Flowers* solitary, axillary.
White. ♄ Through the summer. Saline marshes. 3–5 ft.

Genus VI VERBASCUM.

Calyx 5-parted. *Corolla* rotate, 5-lobed, unequal. *Stamens* 5, declined, usually hairy. *Capsule* 2-valved, 2-celled, ovate or globose.

1 V Thapsus. *Stem* erect, winged, tomentose. *Leaves* alternate, lanceolate, decurrent, tomentose, hoary. *Flowers* in terminal spikes. *Calyx* tomentose, persistent. *Corolla* tomentose on the outer surface. *Seed* dotted.
Yellow. ♂ May—Aug. Common. *Mullein.*

2 V Lychnitis. *Stem* erect, angled. *Leaves* oblong, cuneate, naked above, tomentose beneath. *Flowers* in paniculate spikes, lateral and terminal.
Yellow. ♄ June—July. Car. & Ga.

3 V Blattaria. *Stem* slightly angled, simple, pubescent. *Leaves* sessile, amplexicaule, slightly cordate, serrate. *Flowers* in terminal racemes; peduncles 1-flowered, solitary.
Yellow, tinged with purple. ♂ May—Aug. Common. Mid. Ga. 2–3 ft.

Order XCV. CONIFEREÆ.

Flowers monœcious, or diœcious. *Sterile* flowers monandrous, 5 or monadelphous, collected in a catkin. *Anthers* 2, or many lobed, bursting outwardly. *Fertile* flowers usually in strobiles or cones, sometimes solitary. *Ovary* none, or open, resembling a scale, destitute of style or stigma. *Ovules* naked. *Fruit* a naked seed. *Trees* or shrubs abounding in resin. *Leaves* with parallel veins.

Genus I JUNIPERUS.

Flowers diœcious. *Sterile* florets, ament ovate. *Calyx* a scale, verticillate, peltate. *Anthers* 4–8, 1-celled. *Fertile* florets, ament globose. *Scales* 3-concave. *Stigma* open.— *Fruit* a berry, with 3 long 1-seeded nuts. surrounded with the united and fleshy scales.

1 J Virginiana. A middle sized tree, with horizontal branches. Upper leaves imbricated in 4 rows, ovate-acute, very small, by threes. *Flowers* axillary. *Fruit* dry, 1–2-seeded, covered with a blue powder. *Red cedar.*
♄ May. Common. 20–60 feet.

Genus II CUPRESSUS.

Flowers monœcious. *Sterile* flowers the ament ovate, imbricate. *Scales* peltate, anthers 4, sessile. *Fertile* florets, ament a cone. *Perianth* none. *Ovaries* 4–8 under each scale. *Nuts* angular, compressed.

1 C Distica. A large tree. *Leaves* small, linear, acute, flat, deciduous. *Sterile* flowers paniculate, catkin sub-globose.
♄ May. Deep Swamps. 90–100 feet.

2 C Thyoides. A large tree, with compressed branches. *Leaves* imbricate, in 4 rows, ovate, tuberculate at the base, catkin globose.
♄ May. Swamps. 70–80 feet.

Genus III PINUS.

Flowers monœcious. *Sterile flowers*; scales peltate. *Perianth* none. *Anthers* 2, each 1-celled, sessile. *Fertile flowers* in an ovate cone. *Scales* closely imbricate, 2-flowered. *Pistil* 1. *Nut* winged. *Scales* woody.

(a) *Leaves 2–5, with a sheath at the base; scales of the cone thickened at the summit*

1 P Inops. A small tree, abounding in resin, with scattered, smooth branches. *Leaves* short, in pairs. *Cone* oblong, conic, about the length of the leaves. *Scales* with subulate spines. *Scrub pine.*
ħ May. Sandy barrens. 20–40 ft.

2 P Variabilis. A large tree, much branched. *Leaves* by pairs or threes, slender and channelled, 4–5 inches long, deep green. *Cone* generally solitary, ovate, 2–3 inches long. *Scales* with incurved spines.
ħ April. Along the sea coast. 60–70 ft.

3 P Rigida. A large tree. *Leaves* by threes, 4–6 inches long, with short sheaths. *Cones* ovate, scattered, or in clusters, usually the latter, 2–4 inches long. *Scales* with reflexed spines.
ħ April—May. Usually in the upper country. 70–100 ft.

4 P Serotina. A small tree. *Leaves* by threes, 6–8 inches long. *Cones* ovate, large for the size of the tree. *Scales* with straight, slender spines.
ħ April. Around ponds. 30–40 ft.

5 P Pungens. A middle sized tree, irregularly branched. *Leaves* by pairs, short, acute. *Cones* ovate, clustered, sessile. *Spines* long, subulate, the lower reflected.
ħ Mountains. 40–50 ft.

6 P Tæda. A large tree, with a straight, tall trunk. *Leaves* long, by threes, in long sheaths. *Cones* long, deflexed. *Scales* armed with rigid spines. This is an abundant species but affords very little resin.
ħ April. 80–100 ft.

7 P Palustris. A large tree. *Leaves* by threes, very long, with the sheaths pinnatifid. *Cones* nearly cylindrical, 6–10 inches long. *Scales* muricate. *Long leaved pine.*
ħ April. Common in sandy soils. 80–100 ft.

8 P Strobus. A large tree. *Leaves* by fives, slender, in short sheaths. *Cones* solitary, pendulous, long. *Scales* loose. *White pine.*
ħ April. Mountains. 100–140 ft.

(b) *Leaves solitary, distinct at the base. Scales of the cone even, attenuated, glabrous.*

9 P Balsamea. A small tree. *Leaves* solitary, emarginate, flat, glaucous beneath, somewhat pectinate at the summit, nearly erect, below recurved, spreading. *Cone* solitary, erect, cylindrical. *Bracts* short, obovate, mucronate, somewhat serrulate, with the margins thin and smooth. *Balsam fir. Balm of Gilead.*
ħ May. Mountains. 40–50 ft.

10 P Canadensis. A large or small tree, with horizontal branches. *Leaves* solitary, flat, denticulate, in 2 rows. *Cone* small, ovate, terminal, scarcely longer than the leaves. *Hemlock.*
ħ May. Mountains. 30–100 feet.

11 P Nigra. A large or small tree. *Leaves* solitary, very numerous, 4-angled, scattered, erect, straight, dark green. *Cones* ovate, 1–2 inches long. *Scales* elliptical, imbricate, closely denticulate at the apex, undulate on the margins. *Black spruce.*
ħ April. Mountain swamps. 30–100 ft.

12 P. Alba. A small tree. *Leaves* solitary, 4-sided, less crowded than the preceding species, incurved. *Cones* slender, nearly cylindrical. *Scales* broad, ovate, entire. *White Spruce.*

♄ May. Mountains, swamps. 30–40 feet.

Genus IV. THUYA.

Flowers monœcious. *Sterile florets* ament, imbricate.—*Calyx* a scale. *Anthers* 4, sessile. *Fertile* flowers in cones with scales 2-flowered. *Nut* 1-winged.

1 T Occidentalis. A small tree, with spreading ancipital branches.—*Leaves* imbricate, in 4-rows, appressed, naked, ovate rhomboidal, tuberculate. *Cones* obovate with the inner scales truncate, gibbous below the summit. *American Arbor Vitæ.*

♄ May. Mountain streams. 15–20 feet.

Class II. ENDOGENEÆ, or MONOCOTYLEDONEÆ.

Trunk usually cylindrical, with no distinction of pith, wood and bark increasing by the internal deposition of new matter. *Leaves* with simple, parallel veins running from the base to the apex of the leaf, usually alternate. *Embryo* with 1 cotyledon, or if more than 1, alternate. *Radicle* enclosed in a sheath, through which it bursts in germination.

Sub-Class I. PETALOIDEÆ.

Stamens and *Pistils* naked, or enclosed in a regularly developed corolla.

Group I TRIPETALÆ.

Plants with calyx and corolla distinct, with 3 petals.

Order XCVI. ALISNACEÆ.

Perianth 6-parted, in two rows. *Sepals* 3, herbaceous. *Petals* 3. *Stamens* usually indefinite. *Ovaries* superior, seve-

ral, 1-celled. *Ovules* solitary, or in pairs, erect, or ascending. *Styles* several. *Fruit* dry, indehiscent, 1–2-seeded. *Albumen* none. *Embryo* curved. *Aquatic* plants, with parallel veined leaves.

Genus I SAGITTARIA.

Flowers monœcious. *Sepals* 3, herbaceous. *Petals* 3, colored. *Sterile* florets with stamens numerous. *Fertile* florets with capsules numerous, compressed, each 1-seeded.

1 S Sagittifolia. *Stem* none. *Leaves* ovate, sagittate, acute. *Lobes* long, acute, acuminate, lanceolate, on long petioles, 1–2 feet. *Flowers* whorled, by threes, the upper ones sterile, the lower fertile. *Petals* larger than the calyx, round. *Stamens* numerous. *Capsules* collected into a globose head.
The above species is very variable in the form of its leaves, and its flowers are sometimes diœcious. *Arrow-head.*
White. ♃ Aug.—Oct. In wet places, common. 1–2 ft.

2 S Natans. *Stem* none. *Leaves* floating, eliptic, lanceolate, obtuse, entire, 3-nerved, alternate at the base, the lower ones somewhat cordate, 7-nerved. *Scape* simple, few flowered, 3–6 inches long. *Flowers* small, the upper ones sterile, the lower ones fertile, with the peduncles elongated. *Sepals* lanceolate. *Petals* round. *Stamens* 8. *Capsules* numerous.
White. ♃ May—Aug. In shallow ponds 6–8 in.

3 S Lancifolia. *Stem* none. *Leaves* oval-lanceolate, very long, entire, somewhat coriaceous, glabrous, on long petioles, 1–2 feet. *Scape* 2–3 feet long, simple. *Flowers* verticillate by threes, the upper ones sterile, the lower fertile. *Sepals* tinged with purple, nearly round. *Petals* larger than the calyx. *Stamens* numerous. *Capsules* numerous, collected into a globose head.
White. ♃ April—June. In marshes. 2–3 ft.

4 S Graminea. *Stem* none. *Leaves* linear-lanceolate, entire, 3-nerved, 4–5 inches long, about half an inch wide on long petioles. *Scape* simple. *Flowers* verticillate, the upper sterile, the lower fertile. *Sepals* lanceolate, small. *Petals* larger than the calyx. *Stamens* about 10, hairy. *Capsules* mucronate.
White. ♃ April--June. In wet pine barrens, very common. 4–5 in.

Genus II ALISMA.

Sepals 3, persistent. *Petals* 3. *Stamens* 6. *Ovaries* and *Styles* numerous. *Capsules* numerous, indehiscent. distinct, 1-seeded.

1 A Plantago. *Stem* none. *Leaves* cordate, ovate, 9-nerved, on long petioles. *Scape* triangular, 1–2 feet. *Flowers* in compound, verticillate panicles. *Fruit* obtusely triangular.
White. ♃ July—Aug. In the water. 1–2 feet.

Order XCVII. HYDROCHARIDEÆ.

Flowers monœcious, or diœcious. *Sepals* 3. *Petals* 3. *Stamens* epigynous, definite. *Ovary* solitary, 1-celled.—*Ovules* numerous. *Stigmas* 3–6. *Fruit* indehiscent, 1, or many celled. *Albumen* none. *Floating* plants, sometimes with spiny leaves. *Flowers* spathaceous.

Genus I HYDROCHARIS.

Flowers monœcious. *Sepals* 3, oval, membranaceous. *Petals* 3, narrower than the sepals. *Sterile* florets usually with 2 filaments, united at the base, with a 2-leaved spathe. *Fertile* florets with a 2-leaved spathe. *Styles* 6, 2-cleft. *Capsule* 5-celled, many seeded.

1 H Spongiosa. *Leaves* floating, orbicular, cordate, with purple veins beneath, with inflated vessels near the summit of the stem. *Flowers* axillary. *Style* 6, deeply 2-cleft. *Stigma* simple, spotted. *Seed* numerous, striate.
White, tinged with purple. ♃ July—Sept. Stagnant waters.

Genus II VALISNERIA.

Flowers diœcious. *Sterile* florets. *Spathe* 2–4-parted. *Spadix* covered with minute flowers. *Sepals* 3. *Stamens* 2. *Fertile* flowers. *Scape* spiral, very long. *Spathe* 2-cleft. *Sepals* 3, elongated. *Petals* 3, smaller than the sepals. *Stigmas* 3, sessile. *Capsule* cylindrical, 1-celled, many seeded, 3-toothed.

1 V Spiralis. A floating plant. *Leaves* linear, obtuse, 3-nerved, minutely serrulate. *Scapes* axillary; those bearing the sterile flowers very short, the fertile ones long and spiral, raising the flowers to the surface of the water when ready to expand.
White. ♃ August—September. Still water.

Order XCVIII. COMMELINEÆ.

Sepals 3, distinct. *Petals* 3, sometimes united at the base. *Stamens* 6, or sometimes fewer, hypogynous, a part of them deformed, or abortive. *Ovary* 3-celled, with few ovules in a cell. *Style* 1. *Stigma* 1. *Capsule* 2–3-celled, with as many valves. *Seed* anatropous, inserted by their whole side, on the inner angle of the cell. Herbaceous plants.

Genus I COMMELINA.

Sepals 3. *Petals* 3. *Stamens* 6, usually 3 of them sterile and furnished with cruciform glands. *Capsule* 3-celled, 3-valved.

1 C Communis. *Stem* prostrate, creeping, glabrous, much branched, jointed. *Leaves* alternate, ovate-lanceolate, with cartilaginous margins, sheathing, with the sheath ciliate. *Flowers* on peduncles opposite the leaves. *Bracts* ciliate. *Sepals* unequal, the lateral ones large, obtuse. *Petals* unequal, the lateral ones, rounded, spatulate, the others reniform. *Style* blue. *Seed* 2 in a cell.
Light blue. ☺ June—Nov. Wet grounds.

2 C Erecta. *Stem* procumbent, and erect, branching near the base, slightly pubescent. *Leaves* ovate-lanceolate, slightly scabrous on the upper surface, sheathing; sheath ciliate. *Bracts* cordate, enclosing the flower be-

fore it expands. *Sepals* 3-oval, unequal white. *Petals* 2, larger than the other.
Blue. 4 May—June. Dry sandy soils. 12–18 in.

3 C Virginica. *Stem* erect, slightly pubescent, striate. *Leaves* oblong, finely serrulate, scabrous, slightly hairy, sheathing at the base; sheath ciliate. *Flowers* clustered, axillary, or terminal. *Sepals* 3, membranaceous, unequal. *Petals* 3, unequal, lower one smallest.
Blue. 4 August—Oct. Moist places. 2 ft.

4 C Hirtella. *Stem* erect, hairy. *Leaves* lanceolate, petiolate; sheaths lateral and terminal, sessile. Elliott.
July. In shaded, rocky situations.

Genus II TRADESCANTIA.

Sepals 3. *Petals* 3. *Stamens* 6, villous, with jointed hair. *Style* 1. *Capsule* 3-celled, many seeded.

1 J Virginica. *Stem* erect, branching, glabrous, succulent. *Leaves* long, lanceolate, glabrous, sessile, channelled. *Flowers* in terminal clusters, sessile, pubescent. *Involucre* 2-leaved. *Petals* ovate, expanding in the morning, withering before noon. *Filaments* covered with a plumose down.
Purple. 4 May—June. Upper country. *Spider-wort.*

2 J Rosea. *Stem* erect, simple, succulent. *Leaves* long, linear, glabrous, channelled. *Flowers* in terminal clusters, on elongated peduncles. *Sepals* spotted, small, glabrous.
Rose color. 4 Common. May—Aug. 8–12 in.

Order XCIX. XYRIDEÆ.

Sepals glumaceous, 3. *Petals* 3, unguiculate. *Stamens* 6, with 3 fertile ones inserted into the claws of the petals, and 3 sterile ones alternate with the petals. *Ovary* single. *Style* 3-cleft. *Capsule* 1-celled, 3-valved, many seeded, with parietal placentæ. Herbaceous plants, with radicle ensiform leaves. *Flowers* in terminal imbricate heads.

Genus I XYRIS.

Sepals 3, glumaceous, somewhat cartilaginous. *Petals* 3, equal, crenate. *Stigma* 3-cleft.

1 X Flexuosa. *Stem* erect, spiral, dilated at the summit, furrowed with two lines, glabrous. *Leaves* ensiform, spiral, sheathing. *Flowers* in terminal imbricate heads. *Bracts* ovate, rigid, enclosing the flower. *Petals* unguiculate. *Capsule* 1-celled, 3-valved. *Seeds* numerous, small.
Yellow. 4 July—Sept. Pine barrens, common. 2 ft.

2 X Fimbriata. *Stem* erect, slightly scabrous, dilated at the summit. *Leaves* ensiform, long. *Flowers* in oblong heads. *Bracts* round. *Sepals* fimbriate, longer than the bracts.
Yellow. 4 July—Aug. Middle Ga. 2 ft.

3 X Brevifolia. *Stem* erect, compressed towards the summit. *Leaves* twisted subulate. *Calyx* incised, linear. *Flowers* in globose heads.
Yellow. 4 August—Sept. Pine barrens, common, 12–18 in.

4 X Juncea. *Stem* erect, terete. *Leaves* terete, 4–8 inches long, fistular. Keel of the calyx slightly toothed.
Yellow. 4 May—June. Pine barrens, southern Ga. 12–18 in.

Order C. BROMELIACEÆ.

Calyx gamosepalous, 3-parted, or tubular, persistent. *Petals* 3. *Stamens* 6, inserted into the base of the corolla. *Ovary* 3-celled, usually cohering with the calyx. *Style* simple; stigma 3-parted, often twisted. *Fruit* capsular, 3-celled, many seeded. Plants usually without stems, with rigid, channelled leaves.

Genus I TILLANDSIA.

Calyx 3-cleft, persistent, divided nearly to the base. *Sepals* 3, slightly united at the base. *Capsule* 1–3-celled. *Seeds* comose. Parasitic plants.

1 T Usneoides. *Stem* long, attached to the limbs of trees, covered with membranaceous scales, nearly terete. *Leaves* similar to the stem. *Flowers* solitary, axillary; segments of the calyx lanceolate, membranaceous. *Petals* linear. *Stamens* shorter than the tube. *Long moss.*
Greenish white. ♃ Through the summer.

2 T Bartramii. *Stem* attached to the bark and wood of old trees. *Leaves* subulate, channelled, hoary, covered with whitish scales, cartilaginous at the base. *Flowers* in pairs at the summit of simple leafy scapes. The upper leaves tinged with red at the base.
♃ June. Middle Ga.

3 T Recurvata. *Stem* terete, short. *Leaves* subulate terete, recurved *Flowers* in pairs, at the summit of the stem, sessile. *Petals* longer than the calyx.
Purple. ♃ On old trees. Southern Ga. and Florida.

Genus II AGAVE.

Calyx and *corolla* confounded, 6-parted, erect, tubular, furrowed. *Stamens* 6, longer than the corolla. *Anthers* versatile. *Style* spotted, shorter than the stamens.

1 A Virginica. *Stem*, or *scape* erect, glabrous, succulent. Radicle leaves lanceolate, acute, succulent, serrate; cauline leaves amplexicaule, resembling scales, broad. *Flowers* in long terminal spikes. *Capsule* 3-celled, 3-valved. *Seeds* numerous, compressed, with two rows in each cell, attached to a central placentæ. *Virginian Agave. Rattlesnake's master. Thick leaved snakeroot.*
Greenish white. ♃ July—Aug. Middle Ga. Near Culloden. 4–6 ft.

Tribe II. HEXAPETALOIDEÆ.

Petals and *sepals* confounded, usually 6, and all colored, and undistinguishable from each other.

Order CI. HYPOXIDEÆ.

Perianth petaloid, superior, 6-parted, regular. *Stamens* 6, inserted into the base of the segments. *Ovary* inferior, 3-celled, many seeded. *Style* 1. *Stigma* 3-lobed. *Capsule*

indehiscent, many seeded. Herbaceous plants with grass-like leaves.

Genus I HYPOXIS.

Flowers enclosed in a 2-valved spathe. *Perianth* persistent, 6-parted. *Capsule* elongated, narrowed at the base, 3-celled, many seeded. *Seeds* globular, naked.

1 H Erecta. *Leaves* subulate, entire, hairy, channelled, 3-nerved; scape slender, hairy, slightly compressed, 1–4 flowered. *Perianth* expanding, green on the outer surface.
Yellow. 4 March—April. Very common. 3–6 in.

2 H Filifolia. *Leaves* filiform, hairy, slightly 3-angled; scape usually 2-flowered. *Stigmas* 3.
Yellow. 4 March—April. Mid. and So. Ga. Sandy soils. 6–8 in.

Order CII. BURMANNIEÆ.

Perianth 6-parted, tubular, superior, the three alternate segments small. *Stamens* 3. *Anthers* sessile, 2-celled, the connectivum fleshy. *Ovary* inferior, 3-celled, many seeded. *Style* 1. *Stigma* 3 lobed. *Capsule* 3-celled, 3-valved. *Seeds* numerous. Herbaceous plants, with minute, subulate leaves.

Genus I BURMANIA.

Genus the same as the Order.

1 B Capitata. *Stem* erect, setaceous, glabrous. *Leaves* subulate, minute, alternate. *Flowers* in terminal heads. *Perianth* dilated at the base, enclosing the capsule.
White. ☺ August—Sept. Middle Car. and Ga. 6–3 in.

2 B Cærulea. *Stem* erect, setaceous. *Leaves* minute, subulate. *Flowers* few, in a terminal raceme, with 2 unequal bracts. *Perianth* with the tube contracted, enclosing the capsule, the segments unequal. *Capsule* winged, 3-celled, 3-valved, many seeded.
Blue. ☺ Oct.—Nov. In stagnant swamps. Low country, 2–4 in.

Order CIII. HÆMODORACEÆ.

Perianth petaloid, superior. *Stamens* 3 or 6, arising from the perianth. *Ovary* 3 celled, usually many seeded. *Style* 1. *Stigma* simple. *Fruit* a 3-celled capsule. *Seeds* orthotropous. Herbaceous plants, with showy flowers, the æstivation equitant.

Genus I LACHNANTHES.

Perianth with the border 6-parted, segments unequal, the three inner ones small linear, the three others lanceolate. *Stamens* 3. *Style* declining. *Capsule* 3 celled, many seeded, truncate.

1 L TINCTORIA. *Stem* erect, simple, pubescent towards the summit. *Leaves* ensiform, shorter than the stem. *Flowers* in corymbose panicles. *Stigma* minutely 3-lobed.
Yellow. ♃ July—Aug. In ponds, and wet pine barrens. 2–3 ft.

GENUS II CONOSTYLIS.

Perianth 6-parted, persistent. *Stamens* 6. *Style* conic. *Stigma* simple. *Capsule* 3-celled, many seeded.

1 C AMERICANA. *Stem* or *scape* erect, tomentose, 1–2-leaved. *Leaves* ensiform, narrow, glabrous. *Flowers* in crowded corymbs. *Perianth* woolly within ; segments oblong, acute. *Capsule* nearly globular, glabrous.
Weed Grass.
Yellow. ♃ June—July. Wet places. 12–18.

ORDER CIV. AMARYLLIDEÆ.

Perianth superior, petaloid, regular, the outer segments overlapping the inner. *Stamens* 6, arising from the perianth. *Ovary* 3-celled, with numerous ovules. *Style* 1. *Stigma* 3-lobed. *Fruit* a 3-valved, 3-celled capsule. *Seed* numerous. Herbaceous plants, with ensiform leaves.

GENUS I AMARYLLIS.

Perianth 6-parted, petaloid. *Filaments* 6, inserted into the throat of the tube. *Anthers* incumbent.

1 A ATAMASCO. *Stem* none. *Leaves* linear, entire, glabrous, concave; scape terete. *Spathe* 1-leaved, 2-cleft, at the summit. *Perianth* erect, subcampanulate. *Flowers* solitary. *Atamasco Lily*
White, tinged with red. ♃ June—July. In moist places, common. 6–10 in.

GENUS II PANCRATIUM.

Perianth with the tube very long, with the border 6-parted, segments linear lanceolate, the tube of the perianth bearing a 12-cleft paracorolla. *Stamens* 6.

1 P MEXICANUM. *Stem* none. *Leaves* oblong-lanceolate, glabrous, somewhat succulent; scape simple, generally 2-flowered, the paracorolla bearing the stamens. *Spathe* consisting of 2 pair of membranaceous leaves. *Capsule* 3-angled, 3-celled, 3 valved, many seeded.
White. ♃ April—May. On the border of streams. 1–2 ft.

2 P MARITIMUM. *Stem* none. *Leaves* linear-lanceolate ; scape erect, bearing many flowers. *Paracorolla* 12-toothed, funnel-shaped, erect, not bearing the stamens.
White. ♃ June—Aug. Moist places, middle Ga. 1–2 ft.

ORDER CV. IRIDEÆ.

Perianth tubular, 6-parted, petaloid, irregular, the outer segments largest. *Stamens* 3, opposite the outer segments.

Ovary 3-celled, enclosed in the tube of the perianth. *Ovules* numerous. *Style* 1. *Stigmas* 3, in the *Iris* dilated, and petaloid. *Capsule* 3-celled, 5-valved, dehiscence loculicidal. *Seeds* numerous. Herbaceous plants, with equitant leaves. *Flowers* spathaceous.

Genus I IRIS.

Perianth 6-parted, segments unequal, the outer ones large and reflexed, the inner smaller, and erect. *Stamens* 3-distinct. *Style* none. *Stigmas* 3, petaloid, deflected, covering the stamens.

1 I Cristata. *Stem* compressed, short. *Leaves* ensiform; scape 1-flowered: exterior segments of the perianth, oblong, obtuse, entire, with 3 longitudinal crests, interior petals narrower. *Crested Iris.*
Blue and yellow. 4 Feb.—March. Abundant in Mid. Car. 2–4 in.

2 I Versicolor. *Stem* erect, simple, or branched towards the summit. *Leaves* ensiform. *Flowers* 2–4 at the summit of the scape; segments of the perianth spatulate, exterior segments pubescent on the inner surface, inner ones smaller. *Stigmas* ligulate 2-toothed near the base. *Capsule* ventricose. *Variegated Iris.*
Yellow and purple. 4 April—May. In ponds. Very common. 2–3 ft.

3 I Tripetala. *Stem* slender, columnar. *Leaves* ensiform. *Flowers* solitary, exterior segments of the perianth large, interior very small, 3-toothed. *Stigmas* 2-toothed near the base. *Capsule* obscurely angled.
Purple. 4 April—May. Southern Ga. and Florida. 2–3 ft.

4 I Hexagona. *Stem* columnar. flexuous. *Flowers* solitary, exterior segments of the perianth, spatulate, reflexed, variegated at the base with purple and white, the exterior ones erect, spatulate. *Capsule* hexagonal, ventricose.
Blue. 4 May—July. In swamps in the low country. 2 ft.

5 I Cuprea. *Stem* erect, angled on one side. *Leaves* ensiform axillary; the exterior segments of the perianth obovate, emarginate, the interior smaller. *Stigmas* with a membranaceous margin. *Capsule* ventricose, hexagonal.
Tawney. 4 April—May. In marshes of lower Ga. and Florida.

Genus II SISYRINCHIUM.

Perianth 6-leaved. *Stamens* usually monadelphous, 3. *Capsule* triangular, projecting out of the spathe. With grass-like leaves.

1 S Mucronatum. *Stem* simple, compressed. *Leaves* narrow, acute, usually tinged with blue. *Flowers* in terminal clusters. *Spathe* colored, 2-leaved, with a partial sheath at the base of each peduncle. *Leaves* of the perianth emarginate, mucronate. *Style* triquetrous. *Capsule* 3-valved. 3-celled, many seeded.
Blue 4 June—July. Damp soils. Mountains. 4–6 in.

2 S Bermudiana. *Stem* erect, compressed, glabrous, divided at the summit. *Leaves* ensiform, glabrous. *Flowers* in terminal racemes. *Spathe* 2-leaved, with a small spathe at the base of each peduncle. *Leaves* of the perianth emarginate, mucronate, pubescent. *Capsule* pubescent, 3-celled, 3-valved, many seeded.
Blue. 4 March—May. Damp soils. 12–18 in.

3 S Anceps. *Stem* compressed, winged, simple. *Leaves* ensiform, radicle. *Flowers* in clusters. *Spathe* 2-leaved, unequal: *Leaves* of the perianth mucronate.
Blue. 4 July—August. Dry soils. 8–12 inches.

Order CVI. ORCHIDEÆ.

Perianth superior, ringent, 6-parted, the 3 outer segments colored, the odd one uppermost from the twisting of the ovary, the 3 inner colored, with the odd one below, which is frequently lobed and different from the others, often spurred. *Stamens* 3, united into a central column, epigynous, the two lateral ones usually abortive. *Pollen* powdery, or in waxy masses. *Ovary* usually 1-celled, with 3 parietal placentæ.—*Ovules* numerous. *Style* forming a part of the column with the stamens. *Stigma* a viscid cavity in front of the column. *Fruit* usually an inferior capsule, rarely baccate. *Seeds* numerous. *Albumen* none. Herbaceous plants, usually with tuberous roots. *Leaves* simple, entire.

Genus I GOODYERA.

Perianth ringent, the two outer lateral segments situated beneath the lip, the interior segments ovate, with the lip gibbous at the base, undivided at the summit. *Pollen* consisting of granules in a loose state of cohesion, angular, column free.

1 G Pubescens. *Stem* pubescent towards the summit. *Radicle* leaves ovate, petiolate, reticulate, veined with white. *Flowers* in an oblong spike. *Lip* ovate, acuminate. *Rattlesnake plantain.*
White. 4 July—August. Shady woods. 6–10 in.

Genus II NEOTTIA. (*Syn. Spiranthes.*)

Perianth ringent, the two outer segments affixed beneath the lip, interior ones connivant. *Lip* unguiculate, parallel to the column. *Pollen* farinaceous.

1 N Tortilis. *Stem* pubescent towards the summit. *Radicle* leaves linear, glabrous; cauline ones subulate, acute. *Scape* sheathed. *Flowers* in compact, spiral spikes, the lip 3-cleft, the middle lobe large and crenulate.
White. 4 June—July. Damp soils. Through the summer. 8–12 in.

2 N Cernua. *Stem* erect, sheathed. *Leaves* lanceolate, nerved. *Flowers* in dense spikes, recurved, nodding. *Lip* oblong, acute, entire. This plant varies much in the form of its leaves and the size of its flowers, and in the time of their blooming.
Greenish white. 4 Through the summer. Moist grounds. 1–2 ft.

Genus III LISTERA.

Perianth irregular. *Lip* pendulous, 2-lobed, sessile, column minute, free. *Pollen* farinaceous.

1 L Pubescens. *Stem* erect, pubescent, leafless. *Leaves* all radicle, ovate, acute. *Flowers* in racemes, the lip 2-lobed, the other segments connivant, about as long as the lip. *Capsule* clavate.
Greenish white. 4 June—July. Pine barrens, Car. & Ga

2 L Convallaroides. *Stem* erect, with 2 opposite, sessile leaves near the

middle. *Leaves* cordate, nearly round. *Flowers* in spikes or racemes; segments of the perianth reflected. *Lip* deeply 2-cleft. *Capsule* oval.

Greenish white. 4 May—June. Damp soils. Southern Georgia and Florida. 6–12 inches.

Genus IV CRANICHIS.

Segments of the perianth reflected. *Lip* vaulted. *Pollen* farinaceous. *Anthers* parallel with the style, inserted behind.

1 C Multiflora. *Stem* pubescent towards the summit. *Radicle* leaves oval-lanceolate, glabrous, alternate at the base, on very short petioles; cauline leaves merely scales, sheathing. *Flowers* in a terminal spike, the exterior segments of the perianth lanceolate, pubescent on the outer surface, the 2 upper interior segments obliquely ensiform, connivant. *Lip* vaulted, compressed at the margins, generally enclosing the column. *Capsule* triquetrous, tapering to the base.

Pale green. 4 Sept.—Oct. Southern Georgia and Florida. 1–2 ft.

Genus V POGONIA.

Lip sessile, cucullate, crested internally, the remaining 5 segments distinct, without glands. *Pollen* farinaceous. *Anthers* terminal, persistent.

1 P Ophioglossoides. *Stem* erect, with an oval-lanceolate leaf, and a foliaceous bract near the flower. *Lip* scarcely longer than the other segments, winged, fimbriate, with the centre thickened, with crested ridges. *Flowers* solitary, nodding. *Column* short, thick, solid. *Anthers* in a cavity at the summit of the column.

Purple. 4 April—May. Damp soils, common. 10–15 in.

2 P Divaricata. *Stem* erect, glabrous. *Leaves* narrow, lanceolate, acute, glabrous, one near the middle of the stem, the other at the summit. *Flowers* solitary at the summit of the stem. The three exterior leaves of the perianth linear-lanceolate, the two interior lanceolate, connivant, somewhat fleshy. *Lip* 3-lobed, middle lobe longest, crested, crenulate. *Capsule* furrowed.

Purple. 4 May. Damp soils. 1–2 ft.

3 P Verticillata. *Stem* erect, glaucous. *Leaves* 5, verticillate, oblong-lanceolate, cuneate. *Flowers* solitary at the summit of the stem. The three exterior leaves of the perianth long-linear, the 2 interior lanceolate. *Lip* rather short, 3-lobed, crested along the centre, the terminal lobe undulate. *Anthers* 2-celled.

Greenish. 4 May. Middle Carolina and Georgia. 12–18 in.

Genus VI CALLOPOGON.

Five segments of the perianth distinct. *Lip* unguiculate, the lamina bearded. *Column* free. *Anther* terminal. *Pollen* angular.

1 C Pulchellus. *Stem* erect, glabrous, naked. *Leaves* radicle, ensiform, long, erect, generally but 1. *Flowers* in a terminal spike; segments of the perianth lanceolate, the two lateral exterior ones oblique, the interior narrower. *Anthers* in a small cavity at the summit of the column.

Purple. 4 June—July. In damp soils. 12–18 in.

Genus VII COROLLORHIZA.

Segments of the *perianth* equal, connivant. *Lip* extended

behind, joined to the spur, or free. *Column* free. *Anthers* terminal. *Pollen* masses 4, oblique.

1 C Multiflora. *Stem* glabrous, clothed with sheaths, the upper sheath frequently terminating in a subulate leaf. *Leaves* none. *Flowers* numerous, in a terminal raceme nodding. *Lip* cuneate-oval, with 2 teeth at the base. *Spur* adnate, conspicuous.
Purplish brown. 4 Sept.—Oct. In rich woodlands. 12–15 in.

2 C Odontorhiza. *Stem* erect, slender, enclosed in two or three sheaths. *Flowers* numerous, in terminal racemes, pendulous; segments of the perianth connivant. *Lip* dilated, spotted, with 2 teeth. *Capsule* globose.
Purple. 4 March—April. In rich soils, middle and lower Car. & Ga.

3 C Hyemalis. *Leaf* solitary, large, somewhat plaited, tapering into a long petiole; scape enclosed in about 3 sheaths. *Flowers* in erect, terminal racemes; segments of the perianth nearly equal, connivant, linear-oblong. *Lip* dilated at the summit, ridged along the middle, 3-lobed, the middle lobe nearly round, crenulate. *Pollen* masses 4, waxy.
Purple. 4 May. In rich shaded soils. 12–18 in.

Genus VIII ARETHUSA.

Segments of the *perianth* united at the base. *Lip* joined to the column, cucullate at the apex, crested internally. *Pollen* angular.

1 A Bulbosa. *Stem* sheathed, generally 3–4. *Flower* 1 at the summit of the stem; segments of the perianth nearly equal, the upper ones incurved. *Lip* about the length of the other segments, crenulate, bearded in the middle.
Purple. 4 June. Mountains. 6–12 in.

Genus IX TRIPHORA.

Segments of the *perianth* lanceolate, acute, distinct, connivant. *Lip* unguiculate, cucullate. *Column* spatulate, flat, without wings. *Pollen* farinaceous.

1 T Pendula. *Stem* erect, obscurely angled, nodding at the summit, succulent. *Leaves* alternate, amplexicaule, decurrent. *Flowers* axillary and terminal, 3-4, on short peduncles. *Lip* 3-lobed, the lateral ones inflected.
Purple. 4 July—Aug. Damp soils. 12–18 in.

Genus X. ORCHIS.

Perianth ringent, the upper segment vaulted. *Lip* dilated, entire, with a spur at the base. *Pollen* masses 2, affixed by the base, terminal, pedicillate. Glands contained in a common bag.

1 O Spectabilis. *Root* palmate; scape pentangular, sometimes bearing a leaf. *Flowers* few, large, *Lip* obovate, undivided, crenate, retuse; segments of the perianth connivant; spur clavate. *Bracts* longer than the flower. *Leaves* radicle, oval, glabrous, generally 2, large.
Purple and white. 4 June. Shady woods. 8–10 in.

2 O Nivea. *Scape* erect, lower leaves linear, very long, subulate. *Flowers* in dense spikes. *Bracts* short. *Lip* linear, oblong, entire, the other segments spreading; spur filiform. *Column* small. *Pollen* masses nearly sessile.
White. 4 May—June. Southern Ga.

3 O Viridis. A small plant. *Lip* linear, 3-toothed at the apex, other segments of the perianth connivant; spur obtuse, somewhat inflated. *Bracts* longer than the flowers.

Greenish white. Mountains. 3 in.

4 O Bidentata. *Stem* erect, nearly naked. *Leaves* narrow, lanceolate *Lip* oval, oblong, 2-toothed at the base, the other segments ovate, expanding; spur short, thickened at the point.

Yellowish. 4 May—June. Middle Car. & Ga. 12–18 in.

Genus II HABENARIA.

Perianth ringent. *Lip* dilated, toothed, lobed or fringed, spurred at the base. *Pollen* masses pedicillate. *Glands* of the pedicels naked, distant.

1 H Ciliaris *Stem* erect, leafy, glabrous. *Leaves* lanceolate, acute, entire, sheathing at the base, long. *Flowers* in terminal spikes. *Lip* oblong, lanceolate, beautifully ciliate, double the length of the other segments; spur filiform, long.

Orange yellow, varying with age. 4 In moist lands. 1–2 ft.

2 H Blepharioglottis. *Stem* erect, leafy. *Leaves* lanceolate, acute, sheathing at the base. *Flowers* in terminal spikes. *Lip* lanceolate, ciliate, about as long as the upper petal; spur filiform, pendulous.

White. 4 June—July. Damp soils. 1–2 ft.

3 H Cristati. *Stem* erect, slightly angled, glabrous, leafy. *Leaves* lanceolate, sheathing at the base, long. *Flowers* in a terminal spike, crowded. *Lip* longer than the exterior segments, ciliate, the other segments rounded, the two lateral ones toothed; spur short.

Yellow. 4 June—July. Swamps. 1–2 ft.

4 H Psychodes. *Stem* erect, slender, glabrous. *Leaves* long, lanceolate, sheathing at the base. *Flowers* in loose terminal spikes. *Lip* twice as long as the other segments, 2-parted, with any cleft, the other segments ovate-lanceolate; spur filiform, clavate, ascending longer than the germ.

Pale yellow. June—July. Middle Car. & Ga. 12–18 in.

5 H Elliottii. *Stem* erect, leafy. *Leaves* narrow-lanceolate, sheathing, upper ones small. *Flowers* in crowded spikes, exterior segments of the perianth rather large. *Lip* with the margins toothed, almost fimbriate, smaller than the other segments; spur subulate.

Yellow. 4 July. Low grounds, common. 1–2 ft.

6 H Tridentata. *Stem* erect slender, glabrous. *Leaves* lanceolate, the lower one large, the upper one small. *Flowers* in compact spikes. *Lip* ovate-lanceolate, 3-toothed, the other segments ovate, obtuse, connivant, spur filiform.

White. 4 June—July. Swamps. 1–2 ft.

7 H Fuscescens. *Stem* erect, glabrous, leafy. *Leaves* lanceolate, glabrous, sheathing. *Flowers* scattered in terminal spikes. *Lip* ovate, toothed at the base, the other segments spreading; spur subulate. *Bracts* longer than the flowers.

Brownish yellow. 4 July—Aug. In open lands. Mid. Ga. 10–12 ft.

8 H Michauxii. *Stem* erect, leafy. *Leaves* numerous, ovate-lanceolate, glabrous, sheathing at the base. *Flowers* in a long terminal spike, scattered. *Lip* 3-parted, the lateral segments setaceous, the 2 interior segments 2-parted; spur long, obtuse.

4 Aug—Oct. Pine barrens, southern Car. & Ga.

9 H Repens. *Stem* erect, leafy. *Leaves* lanceolate. *Lip* 3-parted with the lateral segments setaceous, the 2 interior segments of the perianth 2-parted, the lower segment setaceous. *Bracts* as long as the flower.

Greenish yellow. 4 August—Sept. Damp soils. 12–18 in.

Genus XII TIPULARIA.

Segments of the *perianth* spatulate, expanding. *Lip* entire, sessile, spurred at the base. *Column* free, wingless, extended forward. *Anther* persistent. *Pollen* masses 4, parallel.

1 T Discolor. *Root* bulbous, concatinated. *Leaf* solitary, ovate, petiolate, plaited, glabrous. *Flowers* in a terminal raceme, nodding, minute. *Operculum*, furnished with 2 auxiliary valves, closing the masses of the pollen.
Greenish. ♃ August. Pine barrens.

Genus XIII EPIDENDRUM.

Segments of the *perianth* spatulate, expanding. *Lip* 3-lobed at the summit, the middle segment obtuse. *Column* with the lip united into a tube. *Pollen* masses 4, parallel, divided by persistent partitions.

1 E Conopseum. *Root* fibrous, adhering to the barks of trees, branches short, alternate. *Leaves* lanceolate, acute, succulent, entire, generally 2 on each branch, sheathing at the base. *Flowers* in a terminal raceme; exterior segments of the perianth lanceolate, the interior cuneate, smaller. *Anther* operculate.
Yellow, tinged with purple. Aug.—Sept. On the barks of trees along the sea coast of Car. and Ga.

Genus XIV BLETIA.

Leaves of the perianth distinct. *Lip* sessile, cucullate, sometimes spurred. *Column* free. *Pollen* masses 4–8, 2-lobed.

1 B Verecunda. *Leaves* radicle, lanceolate, plaited, broad; scape many flowered. *Lip* ventricose, the border emarginate, furrowed, the interior segments connivant.
♃ July—Aug. Southern Ga. and Flor.

2 B Aphylla. *Stem* erect, simple, scaly. *Leaves* none. *Flowers* in spikes, numerous, pendulous. *Lip* emarginate, crested along the center, the other segments connivant, oblong-lanceolate.
Brown, streaked with purple. ♃ August—Sept. On the margins of swamps. 1–2 ft.

Genus XV MALAXIS.

Segments of the *perianth* expanding, resupinate. *Lip* sessile, entire flattened. *Column* winged. *Pollen* masses 4, becoming waxy.

1 M Liliifolia. *Leaves* 3, radicle, oval-lanceolate, glabrous; scape 3 angled. *Flowers* numerous, in a terminal raceme, the exterior segments of the perianth acute, the 2 interior filiform, reflexed. *Lip* obovate, concave, acute at the summit.
White and yellow. ♃ June—July. Upper Dist. Car. & Ga. 6–8 in.

2 M Ophioglosoides. *Stem* erect, with a single leaf near the middle. *Leaf* ovate, amplexicaule. *Flowers* numerous, in a terminal raceme, small. *Lip* erect, concave, cucullate, bi-dentate, the other segments connivant, the two interior filiform. *Column* minute.
Greenish white. ♃ May—June. Mid. and upper Dist. Car. & Ga. 6–9in.

Genus XVI CYPRIPEDIUM.

Lip ventricose, inflated, saccate, large, the other segments of the perianth expanding, 4. *Column* terminating in a petaloid lobe.

1 C Parviflorum. *Stem* leafy, slightly pubescent. *Leaves* alternate, lanceolate, acute, pubescent beneath, sessile, sheathing. *Flowers* usually solitary, outer segments of the perianth ovate-oblong, acuminate, the inner ones linear, twisted, bearded on the inner surface. *Lip* shorter than the petals, bearded at the base within.

Yellow, spotted. 4 May—June. Upper Dist. Car. & Ga 8–10 in.

2 C Pubescens. *Stem* leafy. *Leaves* oval, clasping pubescent. *Lip* yellow, contracted at the mouth; lobe of the style triangular, oblong, obtuse, the exterior petals acuminate, the interior very long, linear, twisted.

Bright, yellow. 4 May. Middle Ga. Near Culloden, 1–3 ft.

3 C Spectabile. *Stem* leafy. *Leaves* ovate-lanceolate, plaited, entire, pubescent, sheathing at the base. *Flowers* 2–3, large, outer segments broad, oval, the two interior linear-lanceolate, white; lobe of the style white, with red spots. *Lip* longer than the petals, cleft in front.

White and purple. 4 May—June. Mountains. 2–3 ft.

4 C Humile. *Stem* pubescent. *Leaves* lanceolate, nerved, pubescent. *Flowers* solitary. *Lip* large, cleft in front, pubescent, the outer segments brownish purple, the interior narrower and twisted.

Purple, striped. 4 May—June. Rocky soils. Mid. and upper Car. and Ga. 6–12 in.

Order CVII. MARANTACEÆ.

Sepals 3, superior, short. *Corolla* tubular, irregular, in 2 whorls, the outer 3-parted, nearly equal, the inner irregular. *Stamens* 3, with only 1 fertile petaloid. *Ovary* 3-celled. *Ovules* solitary and erect, or numerous. *Style* petaloid, or swollen. *Fruit* capsular. *Seed* round. *Embryo* straight. Herbaceous plants, with creeping roots. *Leaves* simple sheathing. *Flowers* spathaceous.

Genus I CANNA.

Calyx 4 leaved, superior. *Corolla* with a long tube, the margin 6-parted, the three exterior segments reflexed, 2 of the inner ones obovate, undulate, the other one very large, margin reflexed, nearly round. *Style* ensiform. *Stigma* linear, attached to the margin of the style. *Capsule* globose, 3-celled, 3-valved, many seeded.

1 C Flaccida. *Stem* glabrous, terete *Leaves* alternate, lanceolate, large, membranaceous, glabrous, with a long sheath at the base; upper leaves merely a sheath. *Flowers* in a terminal spike. *Bracts* an ovate scale. *Sepals* lanceolate acute. *Petals* flaccid.

Yellow. 4 May—July. Wet soils. Low country of Car. & Ga. 2–3 feet.

Genus II THALIA.

Sepals 3, ovate-lanceolate, concave, small. *Corolla* tubular, 6-parted. *Anther* simple, ovate. *Style* short, deflexed. *Stigma* ringent. *Capsule* 2-celled.

1 T Dealbarta. *Leaves* all radicle, distichous, cordate-ovate, acute, glabrous, long and wide, on very long petioles; scape erect, columnar. *Flowers* in terminal panicles. *Peduncles* jointed, with a many leaved involucre at each joint. *Bracts* 2-flowered, coriaceous. *Sepals* ovate-lanceolate, purple, the three exterior segments of the corolla obovate, equal, the three interior irregular; sterile filaments irregular, the fertile one filiform.

Purple. ♃ June—Sept. In the low country. 3–5 ft.

Order CVIII. JUNCEÆ.

Perianth 6-parted, more or less glumaceous. *Stamens* 3–6, inserted into the base of the segments. *Ovary* 1–3-celled, 1 or many seeded. *Style* 1. *Stigmas* generally 3, sometimes 1. *Fruit* capsular, 3-valved. Dehiscence loculicidal. Herbaceous plants with fistular or flat channeled leaves. *Flowers* brown or green.

Genus I JUNCUS.

Perianth 6-parted, with 2 bracts at the base, glumaceous. *Stamens* 6. *Capsule* 3-celled, 3-valved, many seeded. *Dissepiments* bearing the seeds.

(*a*) *Leaves none.*

1 J Acutus. *Stem* erect, rigid, hard, with a sheath at the base. *Flowers* in terminal panicles. Involucre 2-leaved, erect, spinous. *Leaves* of the perianth lanceolate, acute, the three exterior the longest. *Capsule* obovate, pointed with the persistent style.

Brown. ♃ April. Salt marshes. 2–3 ft.

2 J Effusus. *Stem* erect, terete, soft, with a sheath at the base. *Flowers* in compound panicles. *Stamens* 3. *Leaves* of the perianth acute, equal, with white margins. *Capsule* 3-angled. *Seed* oblong.

♃ April—May. Wet soils, common. 2–3 ft.

3 J Setaceus. *Stem* filiform, terete, declining. *Flowers* in lateral panicles. *Leaves* of the perianth lanceolate, acute, the outer ones largest.

♃ July. Swamps. 2–3 ft.

(*b*) *Plants with leaves.*

4 J Tenuis. *Stem* erect, terete, simple, sometimes naked. *Leaves* channeled, linear-subulate, concave, the radicle ones shorter than the stem; cauline ones longer. *Flowers* in panicles, sessile, the 2 lower leaves of the involucre longer than the panicle.

♃ April—May. In wet pastures, common. 10–12 in.

5 J Dichotomus. *Stem* erect, glabrous, sometimes, naked. *Leaves* channeled, filiform, shorter than the stem, sheathing. *Flowers* in dichotomous panicles, solitary, 1 leaf of the involucre longer than the panicle. *Leaves* of the involucre nearly equal.

♃ April—May. In wet pastures. 1–2 feet.

6 J Bufonius. *Stem* terete, dichotomous towards the summit. *Leaves* an-

gled, subulate, concave, sheathing at the base. *Flowers* in terminal panicles, solitary, or by pairs. *Leaves* of the perianth acute, the 3 exterior longest.
☉ March—May. On the coast. 3–6 in.

7 J Biflorus. *Stem* erect, glabrous, leafy. *Leaves* linear, flat, sheathing. *Flowers* in long panicles. *Leaves* of the perianth lanceolate, somewhat ferruginous. *Stamens* 3.
♃ May—July. Around ditches and ponds. 2–3 ft.

8 J Aristatus. *Stem* erect, compressed. *Leaves* flat, glabrous, nerved, sheathing at the base. *Flowers* in terminal panicles.
♃ May—June. Damp soils, common. 2–3 ft.

9 J Repens. *Stem* geniculate, compressed, leafy. *Leaves* linear, flat. *Flowers* in lateral and terminal fascicles. *Stamens* 3. *Leaves* of the perianth subulate, acute, the interior longest.
♃ May—July. Muddy soils, very common. 6–12 in.

10 J Acuminatus. *Stem* terete, jointed, glabrous. *Leaves* terete, jointed, with an open sheath at the base. *Flowers* in trichotomous panicles. *Leaves* of the perianth acute, rigid, nearly equal. *Stamens* 3.
♃ March—May. Damp, wet places. 1–2 ft.

11 J Polycephalus. *Stem* compressed towards the base, terete above. *Leaves* ensiform, jointed, compressed, long. *Flowers* in panicles, composed of numerous heads. *Leaves* of the perianth acute, nearly equal. *Stamens* 3.

12 J Echinatus. *Stem* terete, glabrous. *Leaves* terete, jointed, sheathing at the base. *Flowers* in large, terminal heads. *Leaves* of the perianth subulate, rigid. *Stamens* 3.
♃ May—Aug. Wet soils, very common. 2 ft.

13 J Campestris. *Stem* leafy, terete. *Leaves* flat, pubescent, shorter than the stem, very hairy at the throat of the sheath. *Flowers* in a simple umbel. *Leaves* of the perianth ovate, acuminate, with membranaceous margins. *Capsule* 3-angled, truncate, 3-valved, 3-seeded.
♃ May—June. Abundant near Macon.

Genus II PLEEA.

Perianth 6-parted, expanding. *Stamens* 9. *Styles* 3. *Capsule* 3-angled, 3-valved, 3-celled. *Seed* numerous, attached to the margin of the valves.

1 P Tenuifolia. *Stem* erect, leafy. *Leaves* ensiform, narrow, glabrous. *Flowers* in a terminal spike. *Spathe* 1-flowered; segments of the perianth, lanceolate, acute.
Yellowish red. ♃ May—June. Wet soils. Car. 1–2 ft.

Order CIX. MELANTHACEÆ.

Perianth 6-parted, petaloid, inferior. *Stamens* 6. *Anthers* usually turned outwards. *Ovary* 3-celled, many seeded. *Style* 3-parted. *Stigmas* 3. *Capsule* divisible into 3 pieces. Herbaceous plants, with leaves sheathing at the base.

Genus I MELANTHIUM.

Perianth rotate, expanding; segments unguiculate, with 2 glands at the base. *Stamens* 6, arising from the claws of the perianth. *Capsule* sub-ovate, 3-celled, partly trifid. *Seed* numerous, winged.

1 M VIRGINICUM. *Stem* erect, terete, pubescent, leafy. *Leaves* long, linear-lanceolate, flat, smooth. *Flowers* in a large panicle, pyramidal. Segments of the perianth ovate, somewhat hastate, flat. *Flowers* polygamous.
Greenish white. ♃ June—July. Wet meadows. 3–4 ft.

2 M MONOICUM. *Stem* erect, pubescent. *Leaves* linear-lanceolate, flat. *Flowers* monœcious, the lower sterile, the upper fertile, in paniculate racemes. *Leaves* of the perianth flat, slightly unguiculate.
Greenish white. ♃ July. Mountains. 1–2 ft.

3 M HYBRIDUM. *Stem* erect, leafy, striate. *Leaves* long, linear, amplexicaule. *Flowers* in racemose panicles, pubescent. *Leaves* of the perianth orbicular, plaited, unguiculate, monœcious.
Greenish white. ♃ May—July. Middle Ga. 2–3 ft.

GENUS II TOFIELDA.

Perianth 6-parted, with a 3-parted involucre at the base. *Stamens* 6. *Style* 1. *Capsule* 3–6-celled, united at the base.

1 T PUBENS *Stem* scabrous, simple, naked towards the summit. *Leaves* ensiform, narrow, glabrous, the upper one very small. *Flowers* in racemes. *Segments* of the perianth lanceolate, alternately larger, the involucre very small, 3-toothed. *Stamens* attached to the base of the perianth. *Capsule* 3-angled, 3-valved, 3-celled, with 2 seeds in a cell.
Green and purple. ♃ July—Sept. In wet soils, common. 1–2 ft.

2 T GLABERRIMA *Stem* terete, leafy near the base. *Leaves* linear, ensiform, sheathing. *Flowers* in racemes, nearly verticillate. *Involucre* small, 3-toothed. Segments of the perianth oblong-oval.
White. ♃ Oct. Middle Car. & Ga. 2–3 ft.

GENUS III HELONIAS.

Perianth 6-leaved. *Leaves* flat, sessile, without glands. *Stamens* 6. *Style* 3, distinct. *Capsule* 3-celled, few seeded, 3-horned.

1 H ERYTHROSPERMA. *Stem* erect, leafy, glabrous. *Leaves* linear, long, nerved. *Flowers* in oblong racemes, with short bracts. *Leaves* of the perianth ovate, sessile, persistent. *Capsule* shortened, with divaricate horns. *Seed* red. *Fly poison.*
White. ♃ April—May. Rich soils 2 ft.

2 H ANGUSTIFOLIA. *Stem* erect, terete, glabrous, leafy. *Leaves* linear, long, subulate, upper ones very minute. *Flowers* in terminal racemes. *Capsule* oblong, with the summit appressed. *Seed* linear.
White. ♃ June—July. Damp soils. 1–2 ft.

3 H DIOICA. *Stem* erect, slightly angled, glabrous, leafy. *Radicle* leaves, spatulate, long; cauline ones narrower, becoming almost linear towards the summit. *Flowers* in simple racemes, dicœcious. *Leaves* of the perianth linear, obtuse, green, 3-furrowed. *Stigmas* 3, sessile. *Capsule* 3-celled, many seeded. *Unicorn plant, or Blazing star.*
White. ♃ May—June. Damp soils, very common. 2–3 ft.

GENUS. IV NOLINA

Perianth 6-parted, expanding. *Stamens* 6. *Stigmas* 3. *Capsule* 3-angled, 3-celled, 1-seeded in each cell.

1 N, GEORGIANA. *Stem* erect, with small, subulate scales at the base. *Leaves*

linear, long, coriaceous, scabrous along the maagins. *Flowers* in racemose panicles, small.
White. 4 April—May. Sand hills. Middle Car. & Ga.

Genus V VERATRUM.

Perianth 6-parted, expanding the segments sessile, without glands. *Stamens* 6, inserted on the recepticle. *Style* 3, short. *Capsule* oblong, 2-valved, many seeded.

1 V Viride. *Stem* erect. *Leaves* large, sheathing at the base, plaited, oval. *Flowers* in paniculate racemes. *Bracts* of the branches oblong-lanceolate, partial ones longer than the sub-pubescent peduncles. *Segments* of the perianth oblong-oval, acute.
Greenish yellow. 4 July Mountains. 3-6 ft.

2 V Parviflorum. *Leaves* oval-lanceolate, flat, glabrous. *Flowers* in slender, expanding panicles. Segments of the perianth acute at each end, bearing the stamens.
Green. 4 July. Mountains. 2-3 ft.

3 V Angustifolium. *Flowers* dioecious, in simple panicles. Segments of the perianth linear. *Leaves* very long, linear, keeled.
Greenish yellow. 4 June. Mountains. 3-4 ft.

Genus VI ZIGADENUS.

Perianth 6-leaved, expanding, with 2 glands at the base of each. *Stamens* 6, inserted into the petals. *Styles* 3, shorter than the stamens. *Capsule* membranaceous 3-celled, many seeded.

1 Z Glaberrimus. *Stem* erect, leafy, terete. *Leaves* sessile, linear-lanceolate, glabrous, channeled, long and wide. *Flowers* in a terminal panicle. *Leaves* of the perianth equal, persistent. *Capsule* 3-sided, furrowed, 3-celled, pointed with the persistent styles. *Seed* numerous, angled.
White. 4 June. In wet soils. 2-4 feet.

Order CX. PONTEDEREÆ.

Perianth tubular, colored, 6-parted, more or less irregular, æstivation circinate. *Stamens* 3 or 6, unequal, perigynous. *Ovary* superior, 3-celled, many seeded. *Style* 1. *Stigma* simple. *Capsule* 3-celled, 3-valved, dehiscence loculicidal. *Seeds* numerous, orthotropous. *Placentæ* central. Aquatic plants, with leaves sheathing at the base. *Flowers* spathaceous.

Genus I PONTEDERIA.

Perianth inferior, 6-parted, bilabiate, the under side of the tube perforated with 3 longitudinal foramina. lower part persistent. *Stamens* 6, unequally inserted. *Capsule* 3-celled.

1. P Cordata. *Stem* none. *Leaves* cordate, obtuse, entire, membranaceous, glabrous; petioles very long, succulent. *Flowers* in crowded spikes. *Corolla* villous on the outer surface, the upper lip 3-parted, the lower 3-cleft,

with a yellow spot at the center, 3 of the stamens at the base of the tube, and 3 at the summit. *Pickerel weed. Wampee.*
Blue. ♃ April—Sept. Bogs and ditches.

2 P Lancifolia. *Stem* none. *Leaves* oblong, lanceolate, nearly linear when young, in other respects similar to the preceding species.

Genus II HETERANTHERA.

Flowers in a spathe. P*erianth* with the border 6-parted, equal. *Stamens* 3. *Anthers* unlike. *Capsule* 3-celled, many seeded.

1 H Reniformis. *Stem* partly floating. *Leaves* orbicular, reniform, on petioles; spathe oblong, acuminate, 3–5 flowered. *Mud plaintain.*
White. ♃ July—Aug. N. Car.

Genus III SYENA.

Sepals 3, persistent. *Petals* 3. *Stamens* 3. *Style* 1. *Capsule* 3-celled, 1-valved.

1 S Fluviatilis. *Stem* herbaceous, partly submersed. *Leaves* subulate, crowded. *Flowers* axillary, solitary, on peduncles longer than the leaves.
Purple. ♃ June. In wet places. Middle Car. & Ga. 2–3 in.

Order CXI. ASPHODELEÆ.

P*erianth* petaloid, 6-parted, regular. *Stamens* 6, often unlike. *Ovary* superior, 3-celled. *Style* 1. *Fruit* usually a 3-celled, 3-valved capsule, dehiscence loculicidal. *Seed* black, with a crustaceous testa. Herbaceous plants.

Genus I ORNITHOGALUM.

P*erianth* 6-leaved, erect, persistent, expanding near the summit. *Stamens* 6, dilated at the base, hypogynous. *Capsule* angled, 3-celled.

1 O Croceum. *Stem* none. *Leaves* linear, nerved, flat,,12–18 inches long; scape terete, glabrous. *Flowers* in a terminal raceme, on peduncles twice as long as the flower. *Bracts* ovate, short; leaves of the perianth oval, obtuse. *Filaments* subulate.
White. ♃ June—July. Middle Ga. 12–18 in.

Genus II ALLIUM.

P*erianth* 6-parted, expanding. *Flowers* in umbels, clustered, arising from a 2-leaved spathe. *Capsule* superior. *Stamens* 6. *Style* 1.

1 A Canadense. *Leaves* linear, flat, straight, about 4–6 inches long; scape terete, erect, about the length of the leaves. Head bearing bulbs; segments of the perianth oval.
White. ♂ June. In wet soils, common.

2 A Cernuum. *Leaves* linear, flat, striate; scape slightly ancipitous. *Flowers* in umbels, numerous, nodding. Leaves of the perianth lanceolate.
Rose colored. ♂ July. Mountains. 1–2 ft.

3 A STRIATUM. *Leaves* glabrous, linear, concave; scape as long as the leaves, compressed; spathe 2-leaved, united at the base, acute, withering. *Flowers* in a simple umbel. Leaves of the perianth unequal, the exterior largest. *Filaments* unequal.

White. ♂ March—April. Low lands. 12–15 in.

4 A MUTABILE. *Leaves* linear, flat, narrow, setaceous at the summit, membranaceous at the base; scape terete; spathe 3-leaved. *Umbels* many flowered. Leaves of the perianth lanceolate, acute.

Green, becoming red. ♂ May—June. Pine barrens. 2 ft.

GENUS III ALETRIS.

Perianth tubular, ovate, 6-cleft, rugose. *Stamens* 6, inserted upon the margin of the orifice. *Style* triquetrous, 3-parted. *Capsule* 3-celled, many seeded, clothed with a marcescent perianth.

1 A FARINOSA. *Stem* none. *Leaves* expanding, oblong, lanceolate, acute, membranaceous, glabrous. *Flowers* in lax spikes; scape terete, furrowed, somewhat viscid, with a few small scales. *Perianth* rough. *Star grass.*

White. ♃ May—June. Pine barrens, common. 2 ft.

2 A AUREA. *Stem* none. *Leaves* lanceolate, acuminate. *Flowers* in a terminal spike, sub-campanulate. *Perianth* becoming rugose and scabrous.

Yellow. ♃ July—Aug. Pine barrens. 2–3 ft.

ORDER CXII. SMILACEÆ.

Flowers dioecious, or perfect. *Perianth* petaloid, 4 or 6-parted. *Stamens* 4–6, inserted into the base of the perianth. *Ovary* 3-celled, 1, or many seeded. *Style* usually 3-parted. *Stigmas* 3. *Fruit* baccate. *Seeds* with a membranaceous testa, shrubby or herbaceous, often climbing. *Leaves* sometimes reticulated.

GENUS I SMILAX.

Flowers dioecious. *Perianth* campanulate, spreading, 6-parted. Sterile florets with 6 stamens, fertile ones with 3 styles, and 3 stigmas. *Berry* globose, 3-celled.

(*a*) *Stem shrubby.*

1 S HASTATA. A twining plant. *Stem* angled, glabrous, becoming prickly with age. *Leaves* alternate, lanceolate, acuminate, hastate, 3-nerved, ciliate. *Flowers* in axillary umbels. *Berry* globose, black.

White. ♄ June—July. In rich soils.

2 S BONA NOX. Climbing over small shrubs. *Stem* unarmed, angled. *Leaves* cordate ovate, sometimes slightly hastate, glabrous, 7-nerved, prickly along the midrib and margins. *Flowers* in small axillary umbels. *Fruit* black.

White. ♄ Damp rich soils.

3 S QUADRANGULARIS. *Stem* quadrangular, prickly at the base, unarmed towards the summit. *Leaves* ovate, unarmed, slightly cordate, 5-nerved, distinctly reticulate.

White. ♄ June—July. Dry soils.

4 S Walteri. *Stem* angled, spiny. *Leaves* cordate, ovate, smooth. 3-nerved. *Fruit* red, 3-seeded.
White. ♄ July. Low country of Car.

5 S Sarsaparilla. *Stem* slightly angled, prickly; prickles subulate, incurved. *Leaves* ovate-lanceolate, unarmed, cuspidate, 5-nerved, glaucous beneath. *Flowers* on long peduncles, small. *Fruit* black, 3-seeded.
White. ♄ June—July. Rich soils.

6 S Ovata. *Stem* nearly terete, unarmed, branching covering small shrubs. *Leaves* ovate, cuspidate, 3-nerved, unarmed, mucronate, on short petioles. *Flowers* in small umbels, fragrant. *Fruit* black.
Greenish. ♃ June—July. Sea Islands.

7 S Lanceolata. *Stem* climbing, terete, the upper branches unarmed. *Leaves* lanceolate, and ovate, membranaceous, 3–5-nerved, perennial. *Flowers* numerous in axillary umbels, on short peduncles. *Fruit* red.
White. ♄ May—June. Damp rich soils.

8 S Laurifolia. *Stem* prickly, climbing, branches unarmed. *Leaves* oval-lanceolate, crowded, acuminate, lucid, perennial. *Flowers* in axillary umbels on short peduncles. *Fruit* black, 1-seeded.
White. ♄ July. Swamps.

9 S Pumila. *Stem* unarmed, prostrate, pubescent, sparingly branched. *Leaves* cordate-ovate, somewhat 5-nerved, pubescent beneath. *Flowers* in axillary umbels, on short peduncles. *Fruit* white, 1 seeded.
Greenish yellow. ♄ Sept.—Oct. In rich shaded soils.

10 S Pseudo China. *Stem* climbing, unarmed, lower leaves cordate, 5 nerved, those of the branches ovate. *Flowers* in axillary umbels, on long peduncles. *Fruit* black.
White. ♄ June—July. Very common.

11 S Rotundifolia. *Stem* prickly, flexuous. *Leaves* cordate, ovate, nearly round, 5–7-nerved, pale beneath. *Flowers* in umbels, on very long peduncles.
White. ♄ June. Rich soils.

12 S Caduca. *Stem* flexuous, prickly, somewhat angled. *Leaves* ovate, mucronate, 5-nerved. *Flowers* in axillary umbels, on short peduncles.
White. ♄ June—July. Dry fields. Very common.

13 S Tamnoides. *Stem* twining, prickly, terete. *Leaves* ovate-oblong, 5-nerved, panduri-form, acute, shining, somewhat rigid. *Flowers* in axillary umbels. *Fruit* black.
White. ♄ June—July. Dry soils.

(b) Stem herbaceous.

14 S Pedunculares. *Stem* terete, unarmed, bearing stipular tendrils. *Leaves* cordate, ovate, slightly acuminate, 3-nerved. *Flowers* in umbels, on long peduncles. *Fruit* blue. The whole plant fœtid.
Greenish. ♄ May—July. Rich soils.

15 S Herbacea. *Stem* slightly angled, glabrous, sparingly branched. Young leaves oval, or ovate when old, slightly cordate, the upper ones verticillate and crowded, 5–7 nerved, pubescent beneath. *Flowers* in long compressed peduncles, arising from the base of the stem. *Fruit* black, 2–3-seeded.
Yellowish white. ♄ May—July. Fertile soils, common.

Genus II CONVALARIA.

Perianth campanulate 6-cleft inferior. *Stamens* 6, inserted into the base of the perianth. *Style* 1. *Fruit* globose, 3-celled, cells 1–2-seeded.

1 C Masalis. *Leaves* ovate; scape naked, smooth. *Flowers* in spikes, campanulate, nodding.
White. ♃ May. Mountains. 1–2 ft.

Genus III STREPTOPUS.

Perianth 6-parted, revolute, campanulate, with nectariferous pores at the base. *Stamens* 6. *Style* 1. *Fruit* baccate, sub-globose, 3-celled, few seeded.

1 S Roseus. *Stem* erect, glabrous, dichotomous. *Leaves* oval, acuminate, clasping, many nerved. *Flowers* axillary, solitary, small, on nodding peduncles.

Rose colored. ♃ May—June. Mountains. 12–18 in.

Genus IV MEDEOLA.

Perianth 6-parted, revolute. *Stamens* 6. *Stigmas* 3, united at the base. *Fruit* 3 celled, each cell 3–6-seeded.

1 M Virginica. *Stem* erect, terete, with small sheaths at each joint. *Leaves* verticillate around the middle of the stem, 6–8 in a whorl, a three leaved whorl at the summit, lanceolate, 3-nerved, entire, membranaceous. *Flowers* terminal on peduncles arising from the upper whorl. *Indian cucumber.*

Yellow. ♃ May—July. In rich shaded soils. 12–18 in.

Genus V TRILLIUM.

Perianth 6-parted, the 3 outer resembling a calyx, the 3 inner petaloid. *Stamens* 6, inserted into the base of the segments. *Stigmas* 3, usually distinct. *Fruit* 3-celled, many seeded.

1 T. Sessile. *Stem* erect, glabrous, spotted, with sheaths at the base. *Leaves* 3 at the summit of the stem, sessile, broad ovate, acute. *Flowers* sessile, erect, the petal-like segments lanceolate, erect, twice as long as the calyx. *Fruit* glabrous, dark purple.

Dark purple. ♃ March April. Rich lands, common. 6–12 in.

2 T Pusillum. *Plant* small. *Leaves* sessile, oval, oblong, obtuse. *Peduncle* erect. *Petals* scarcely longer than the calyx.

Flesh colored. ♃ May—June. Pine barrens. 3–6 in.

3 T Erectum. *Leaves* broad, rhomboid, acuminate, sessile. *Peduncle* inclining. *Flower* nodding. *Petals* ovate, acuminate, flat, broader than the calyx.

Dark purple, or white. ♃ May—June. Common.

4 T Grandiflorum. *Leaves* rhomboid-ovate, broad, sessile, acuminate. *Peduncle* erect, or slightly inclined. *Flower* nearly erect. *Petals* longer than the calyx, spatulate-lanceolate.

White, or reddish. ♃ May—June. Banks of streams. 8–12 in.

5 T Erythrocarpum. *Leaves* ovate, acuminate, rounded at the base, abruptly contracted into a short petiole, *Peduncle* erect, or declining. *Petals* ovate-lanceolate, recurved, broader than the calyx.

White, with purple veins. ♃ May—June. Shady woods. 6–8 in.

6 T Pendulum. *Leaves* rhomboidal, nearly round, acuminate, almost sessile. *Peduncle* recurved. *Flower* pendulous. *Petals* ovate, acuminate, expanding, about equal to the calyx.

White, with red veins. ♃ April—May. Mountains. 10–12 in.

7 T Cernuum. *Leaves* rhomboidal, acuminate, very large, on rather long peduncles. *Peduncle* recurved. *Petals* lanceolate, acuminate, reflected, about as long as the calyx.

White. ♃ April—May. Rocky places 12–18 in.

8 T Catesbæi. *Leaves* obovate, and oval, acuminate, attenuate at the

base. *Peduncle* recurved. *Petals* lanceolate, expanding, larger than the calyx.
Rose color. ♃ April—May. Upper Car. and Ga. 10–12 in.

9 T Nervosum. *Leaves* lanceolate, ovate, acute, membranaceous. *Peduncle* recurved. *Petals* oblong lanceolate, larger than the calyx.
Rose color. ♃ April—May. Middle and upper Car. & Ga. 12 in.

Genus VI UVULARIA.

Perianth inferior, 6-parted, erect, with a nectariferous cavity at the base. *Stamens* 6, hypogynous, short. *Stigmas* 3, reflexed. *Capsule* 3-celled, 3-valved, many seeded, angled.

1 U Perfoliata. *Stem* erect. *Leaves* perfoliate, eliptic, obtuse. *Perianth* campanulate, granular within. *Flowers* solitary, axillary, nodding. *Capsule* 3-angled, truncate.
Yellow. ♃ April. Common. 8–12 in.

2 U Flava. *Leaves* perfoliate, eliptic oblong, obtuse, undulate at the base. *Perianth* tapering at the base, scabrous within. *Anthers* awned.
Bright yellow. ♃ May—June. Sandy soils, common. 8–12 in.

3 U Grandiflora. *Leaves* perfoliate, oblong, acute. *Perianth* glabrous. *Anthers* unawned. *Nectaries* nearly round, pistil shorter than the stamens.
Yellow. ♃ May—June. Rocky hills. 12–18 in

4 U Puberula. *Leaves* oval, rounded at the base, amplexicaule, pubescent along the margin. *Flowers* few, glabrous.
Yellow. ♃ May—June. Upper Car & Ga. 8–12 in.

5 U Sessilifolia. *Leaves* sessile, lanceolate-oval, many nerved. *Flower* 1, on a short peduncle. Segments of the perianth flat, smooth within.
Yellow. ♃ May—June. Common. 8–12 in.

Order CXIII DIOSCOREÆ.

Flowers diœcious. *Perianth* superior, 6-cleft, equal. *Stamens* 6, inserted into the base of the perianth. *Ovary* 3-celled, with 1–2 ovules in a cell. *Style* deeply 3-parted. *Stigmas* simple. *Fruit* a thin, compressed capsule. *Seed* flat. *Embryo* small. Twining, herbaceous plants, with reticulated leaves.

Genus I DIOSCOREA.

Genus the same as the order.

1 D Villosa. *Stem* herbaceous, climbing over shrubs, terete. *Leaves* alternate, opposite and verticillate, the lower verticillate, the upper alternate, cordate, acuminate, 9-nerved, pubescent beneath. *Sterile* flowers in axillary panicles, small. *Fertile* flowers in simple racemes. *Styles* 3. *Capsule* 3-celled, 3-winged, 2-seeded. *Yam root.*
White. ♃ May—July Sandy soils, common. 10–12 ft.

2 D Quaternata. *Stem* climbing. *Leaves* verticillate, or alternate, cordate, acuminate, glabrous, 7-nerved, lateral nerves bifid.
White. ♃ July. Old fields. 6–8 feet.

Order CXIV. LILIACEÆ.

Perianth colored, regular, deeply 6-parted. *Stamens* 6,

perigynous, opposite to the segments. *Ovary* superior, 3-celled, many seeded. *Style* 1. *Fruit* capsular, 3-celled, 3-valved, many seeded, dehiscence loculicidal. *Seed* in 1–2 rows. *Embryo* straight. *Plants* usually with scaly bulbs.

Genus I LILIUM.

Perianth campanulate, deeply 6-parted. *Segments* straight, or reflexed, with a longitudinal, nectariferous line. *Stamens* 6. *Stigma* entire.

1 L. Catesbæi. *Stem* erect, simple, glabrous. *Leaves* sessile, linear-lanceolate, appressed, most numerous near the middle of the stem. *Flowers* solitary, terminal. *Perianth* erect, the segments with long claws, undulate at the margin, reflexed at the summit.

Scarlet, spotted with yellow and brown. 4 June—Aug. Pine barrens. 18–24 in.

2 L. Philadelphicum. *Stem* erect glabrous. *Leaves* verticillate, linear-lanceolate, acuminate. *Flowers* 1–2 *Perianth* erect, campanulate, spreading segments unguiculate.

Dark orange, spotted at the base. 4 July—Aug. Woods. 1–2 ft.

3 L. Canadense. *Stem* erect, terete, glabrous. *Leaves* verticillate, in remote whorls, lanceolate, 3 nerved, hirsute along the nerves beneath. *Flowers* on long, reflected peduncles, generally by threes. *Perianth* campanulate, revolute; segments lanceolate.

Yellow, spotted on the inside. 4 July—Aug. Wet lands. 2–3 ft.

4 L. Carolinianum. *Stem* erect, terete. *Leaves* verticillate and scattered, lanceolate, cuneate. *Flowers* terminal, solitary, in pairs, or by threes. *Perianth* with the segments long, lanceolate, the midrib of the three interior winged.

Deep yellow, spotted with purple. 4 July—Aug. Damp soils. Low country. 1–2 ft.

5 L. Superbum. *Stem* erect, terete, glabrous. *Leaves* linear-lanceolate, 3-nerved, the lower ones verticillate, the upper scattered. *Flowers* in a pyramidal raceme. *Perianth* revolute. *Superb lily.*

Deep yellow, spotted with purple. 4 July—Aug. Up country. 5–6 ft.

Genus II YUCCA.

Perianth campanulate, expanding. *Stamens* 6. *Stigma* sessile. *Capsule* 3-celled.

1 Y. Filamentosa. *Leaves* lanceolate, with filamentous margins, the veins roughened on both surfaces. *Scape* long terminated by a long panicle. *Stigmas* recurved, expanding. *Silk grass. Bear grass.*

White. 4 Aug.—Sept. Common in rich soils. 7–8 ft.

2 Y. Gloriosa. *Stem* erect, thick, succulent, usually simple, roughened towards the base by the remains of decayed leaves. *Leaves* crowded, lanceolate, acute, thick. *Flowers* in a large, terminal panicle, consisting of simple racemes. *Pedicels* supulate at the base. *Perianth* 6-leaved; leaves lanceolate, acute, slightly ciliate *Filaments* pubescent, compressed. *Stigmas* bifid, concave. *Capsule* pulpy, glabrous.

White. ♄ May—Aug. On the sea coast. 2–6 ft.

3 Y. Draconis. *Stem* erect, branching. *Leaves* lanceolate, reflexed when old, the margins rigid; the young leaves erect and expanding. *Flowers* in racemose panicles similar to the preceding.

White ♄ May—Aug. On the sea coast. 10–12 ft.

4 Y. Recurvifolia *Stem* erect simple. *Leaves* recurved, linear-lanceolate,

with the margins filamentose. *Flowers* in racemose panicles. Leaves of the perianth unequal, the interior widest.

White. ♄ May—Aug. On the sea coast of Ga. 3–4 ft.

Genus III ERYTHRONUM.

Perianth 6-leaved, campanulate. *Stamens* 6. *Style* 1, 3-angled. *Nectary* consisting of 2 tubercles attached to the base of alternate leaves.

1 E Americanum. *Leaves* lanceolate, sheathing at the base, variegated with purple. *Scape* bearing a solitary, nodding flower. The 3 exterior leaves of the perianth reflected. *Stamens* short. *Capsule* 3-celled, 3-valved, many seeded.

Yellow. ♃ March—April. Common. 6–8 in.

Remarks. This plant when fresh, has long been known to be an emetic, but, as far as we know, has been but little used for any purpose. In scrofulous sores it is used in family practice, by making the fresh plant into poultices, with milk, and applying to the sores. Happy effects are said to result from its application in this manner.

Order CXV. PALMÆ.

Flowers perfect, or polygamous. *Perianth* 6-parted, in 2 series, persistent. *Stamens* 6, opposite the segments of the perianth, into the base of which they are inserted. *Ovary* 1–3-celled: when 3-celled it is deeply lobed, cells 1-seeded. *Fruit* baccate, or drupaceous.

Genus I SABAL.

Flowers perfect. *Stamens* 6. *Styles* 3. *Spathes* partial. *Filaments* thickened at the base. *Fruit* a 1-seeded berry. *Seed* bony.

1 S Pumila. *Stem* none. *Leaves* flabelliform, 1–3 feet high. *Stipes* naked, compressed. *Scape* erect, terminated by a long panicle. *Flowers* small, nearly sessile. *Fruit* nearly round, bluish black. *Dwarf Palmetto.*

White. ♃ June—Aug Along the coast of Car. & Ga. 4–6 ft.

Genus II. CHAMÆROPS.

Flowers polygamous. *Spathe* compressed; spadix branching. *Filaments* partly united. *Drupe* 3-celled, only 1 usually containing a seed.

1 C Serrulata. *Stem* creeping. *Leaves* flabelliform, with the stipes sharply serrate. *Scape* terminated by a panicle. *Flowers* small. *Fruit* nearly black, 1 seeded.

White ♃ July—Aug. Common, in sandy soils, along the Ocmulgee.

2 C Histrix. *Stem* creeping. *Leaves* flabelliform, with the stipes intermingled with long thorns from the root. *Flowers* as in the preceding species. *Blue Palmetto.*

White. ♃ June—Aug. In clayey soils. 4–5 ft.

3 C Palmetto. A tree. *Leaves* palmate, flabelliform, 5–6 feet in length crowded at the summit of the tree. *Flowers* in naked panicles. *Fruit* bluish black. *Palmetto.*

White. ♄ June—July. On the sea coast of Car. & Ga. 40–50 ft.

Remarks. The following remarks of Elliott on the *C. Palmetto*, we consider peculiarly appropriate. "This palm possesses a great and, to this country, an increasing value. It is the only tree produced in our parts which is not attacked by the *Teredo Navalis*; and as it is incorruptible in salt water, its value for sub-marine construction is almost incalculable.

Its leaves can be employed in the manufacture of hats, baskets, mats, and many other purposes of domestic economy; and the Cabbage, composed of the unexpanded embryo leaves, may be classed among the most delicious vegetables produced on our tables. It is, however, a wasteful luxury, as the tree always perishes when deprived of this part of its foliage."

Order CXVI. RESTIACEÆ.

Flowers monœcious. *Perianth* 4-parted. *Stamens* 4–6, attached to the perianth. *Ovary* 2–3-lobed, 2–3-celled, with a solitary, pendulous ovule in each cell. *Fruit* capsular. Herbaceous plants, with stems naked, or bearing leaves. *Flowers* in terminal heads, separated by bracts.

Genus I ERIOCAULON.

Flowers monœcious; sterile florets occupying the center of the capitulum. *Stamens* 4–6. *Perianth* 4-parted, the 2 interior segments cohering; fertile florets in the circumference; perianth 4-parted. *Style* 1. *Stigmas* 2 or 3.

1 E. Decangulare. *Leaves* ligulate, very narrow, glabrous, 10–12 inches long. *Scape* terete, 10-furrowed, glabrous, sheathed near the base, bearing a large, spherical head. Scales of the *involucre* ovate, those of the disk longer than the flowers. *Perianth* somewhat fimbriate.
White. ♃ July—Aug. Wet soils. 2–3 ft.

2 E. Gnaphaloides. *Leaves* subulate, ensiform, glabrous, 8–10 inches long. *Scape* 10-furrowed, sheathed at the base. *Flowers* in a compact head.—Scales of the *involucre* oval, silvery white, villous when young.
White. ♃ May—Aug. Damp soils. 10–15 in.

3 E. Villosum. *Leaves* subulate, hairy, 2–3 inches long. *Scapes* villous, slender, clustered. *Flowers* in small, globose heads. Scales of the *involucre* colored, ovate. *Perianth* very dark colored, with the summit white.
♃ May—Sept. Damp soils. 10–12 in.

4 E. Flavidulum. *Leaves* subulate, nerved, 1–2 inches long, slightly hairy. *Scape* 7-furrowed, pubescent, or glabrous. *Flowers* in convex heads. Scales of the *involucre* nearly round, those of the disk linear-lanceolate. *Capsule* didymous.
♃ June—July. Wet soils. Mid. Car. & Ga. 3–4 in.

Order CXVII. TYPHACEÆ.

Flowers monœcious, arranged upon a naked spadix. *Perianth* 3-leaved. *Stamens* 3 or 6, with long filaments. *Anthers* wedge shaped. *Ovary* superior, 1-celled, with a solitary, pendulous ovule. *Style* short. *Stigmas* linear, 1 or 2. *Fruit* indehiscent, 1-celled, 1-seeded. Herbaceous plants, growing in marshes. *Leaves* ensiform. *Spadix* without a spathe.

Genus I SPARGANIUM.

Flower monœcious; sterile florets ament nearly spherical, dense; perianth 3-leaved; fertile florets ament nearly spherical; perianth 3-leaved. *Stigma* 2-cleft, or simple. *Fruit* a dry, 1-seeded drupe.

1 S Americanum. *Stem* flexuous, terete, glabrous, sparingly branched. *Leaves* ligulate, glabrous, thick, the lower ones caronate, about as long as the stem; the upper concave at the base, erect. *Flowers* in sessile, globular heads; fertile heads 2–5, usually sessile; sterile ones, 6–9. *Stigma* simple, oblique.

♃ May—June. In stagnant waters. 12–15 in.

Genus II TYPHA.

Flowers monœcious, collected into a long, cylindrical spike; sterile florets perianth wanting. *Stamens* united into a common filament; fertile florets perianth none. *Pericarp* pedicillate, surrounded at the base with hairs resembling a pappus.

1 T Latifolia. *Stem* terete, glabrous. *Leaves* linear, nearly as tall as the stem, sheathing at the base. *Flowers* in a cylindrical spike, the upper ones sterile, the lower ones fertile.

♃ July—Aug. In stagnant waters. 5–6 ft.

Order CXVIII. AROIDEÆ.

Flowers monœcious, or perfect, arranged upon a spadix, sometimes naked. *Perianth* either wanting or 4–6-parted. *Stamens* definite, or indefinite, hypogynous, short. *Ovary* superior, 1-celled, or rarely 3-celled. *Stigma* sessile. *Fruit* indehiscent, solitary, or several. Herbaceous plants, generally with tuberous roots. *Leaves* sheathing, with parallel veins.

Genus I ACORUS.

Spadix cylindrical, covered with flowers. *Perianth* glumaceous, 6-leaved, naked. *Stamens* 6. *Stigma* sessile. *Capsule* 3-celled, 3-angled, many seeded.

1 A Calamus. *Leaves* ensiform, ancipitous, glabrous, entire. *Scape* 3-angled, concave on one side, with the summit resembling the leaves. *Flowers* on a cylindrical spadix, protruding from the side of the ensiform scape. *Stigma* obtuse. *Sweet flag*;

Pale yellow. ♃ April. Wet places. 2–3 ft.

Remarks. The dried root of this plant is known in shops under the name of Calamus. It is a stimulant, tonic and aromatic: It is prescribed in the regular practice a s aid to cathartic medicines, and in cases of debility of the alimentary canal. It was anciently much more highly esteemed than at the present day.

Genus II ORONTIUM.

Spadix cylindric, crowded with flowers. *Perianth* 6-leaved, naked. *Stigma* sessile, very small. *Fruit* 1-seed.

1 O Aquaticum. *Leaves* lanceolate, ovate, radicle, entire, glabrous, somewhat glaucous, membranaceous. *Spathe* short. *Spadix* long, green at the base, purple in the middle, white at the summit. *Perianth* small, persistent. *Filaments* short. *Fruit* globular, fleshy. *Golden club.*

Yellow. 4 March—April. In marshes, very common. 1-2 ft.

Genus III ARUM.

Flowers monœcious. *Spathe* 1-leaved, cucullate, convulute at the base. *Spadix* naked at the summit, bearing sterile florets in the middle, and fertile ones at the base. *Perianth* none. *Fruit* 1-celled, many seeded.

1 A Dracontium. *Leaves* perhaps never but one, pedate, leaflets lanceolate, oblong, entire, 1, on long petioles. *Spadix* subulate, longer than the spathe. *Green Dragon.*

White. 4 June. Moist places. 10–12 in.

2 A Triphyllum. *Leaves* ternate; leaflets ovate acuminate, entire. *Spadix* clavate, about half as long as the spathe. *Fruit* scarlet, 3–4-seeded. This species is said to be sometimes dioecious. The *A. Quinatum* differs in no respect from the above, but in its quinnate leaves.

Dragon root. Wake robbin. Indian turnip.

Purple, striped. 4 March—April. Rich soils. 10–12 in.

3 A Virginicum. *Leaves* oblong, hastate, entire, glabrous, 10–15 inches long; petioles long, sheathing at the base; spathe incurved. *Spadix* about as long as the spathe. *Fruit* many seeded.

4 April—May. Marshy soils, very common. 12—18 in.

4 A Walteri. *Leaves* sagittate, triangular with the lobes divaricate, acute, probably only a variety of the preceding.

Remarks.—The root of the *A. Triphyllum* is possessed of decided medicinal properties, which are due to an exceedingly volatile substance, which is mostly dissipated by drying, and wholly by boiling. It is exceedingly acrid, producing intense pain in the mouth by biting the fresh root. It is not soluble in water, alcohol or ether, as it communicates none of its properties to these fluids. It has been employed with much benefit in *Asthma, Chronic Coughs, Rheumatism*, &c. It is administered by grating the dried root, and mixing it with sugar, in a dose of ten grains.

4 April—May. In swamps. 12–18 in.

Genus IV. CALADIUM.

Flowers monœcious, sterile florets *perianth* none. *Stamens* numerous. *Anthers* peltate, collected in a spike at the summit of the spadix. Fertile florets *perianth* none at the base of the spadix. *Stigma* sessile. *Fruit* 1-celled, many seeded.

1 C Glaucum. *Leaves* hastate, cordate, acuminate, entire, glaucous, lobes long; scape about the length of the petioles; spathe cucullate, dilated at the summit. *Spadix* longer than the tube, with the sterile florets extending to the summit. *Fruit* red, many seeded.

White. May—June. Wet soils. 12–15 in.

Order CXIX. FLUVIALES.

Flowers monœcious, or perfect. *Perianth* 2 or 4-parted, or none. *Stamens* hypogynous, definite. *Ovary* superior,

with a solitary ovule. *Stigma* simple. *Fruit* indehiscent, 1-celled, 1-seeded dry. *Seed* pendulous, anatropous. Aquatic plants, with cellular leaves.

Genus I. ZOSTERA.

Flowers monœcious. *Perianth* none. *Stamens* and *pistils* separated, in two rows, upon one side of the spadix. *Spathe* foliaceous. *Anthers* sessile, alternating with the ovaries. *Drupe* 1-seeded.

1 Z Marina. *Stem* flexuous, terete, somewhat jointed. *Leaves* long, linear, entire, somewhat 3-nerved. *Anther* slightly curved. *Style* short. *Capsule* membranaceous. *Grass wrack.*
4 August. Salt waters.

Genus II. CAULINIA.

Flowers monœcious. *Perianth* none. *Anther* 1, sessile. *Style* filiform. *Stigma* 2-cleft. *Capsule* 1-seeded.

1 C Flexilis. *Stem* slender, glabrous, submersed, branching. *Leaves* verticillate, in a whorl, linear, denticulate at the summit. *Flowers* solitary, axillary, sessile.
4 May—July. Stagnant waters. 2–3 ft.

Genus III. RUPPIA.

Flowers perfect, on a spadix, arising from the base of the leaves. *Stamens* sessile. *Stigmas* 4. *Ovaries* 4. *Perianth* none. *Fruit* pedicillate, consisting of four 1-seeded drupes.

1 R Maritima. *Stem* floating, glabrous. *Leaves* filiform, with inflated sheaths. *Peduncles* axillary, somewhat spiral, bearing 2 naked green flowers. *Anthers* 4, sessile.
4 July. Salt marshes.

Genus IV. POTAMOGETON.

Flowers perfect, on a spadix arising from the spathe. *Perianth* 4-leaved. *Anthers* 4, sessile, alternating with the leaves of the perianth. *Nuts* 4, 1-seeded, sessile.

1 P Fluitans. *Stem* branching, glabrous. *Leaves* floating, on long petioles, sub-coriaceous, oval-lanceolate, the lower ones narrow, sessile, long. *Flowers* in axillary spikes, almost submersed.
4 May—June. Stagnant waters. 2–6 ft.

2 P Heterophyllum. *Stem* branching, glabrous, upper leaves opposite, lanceolate, 5-nerved; lower ones linear, sessile. *Flowers* crowded on the spadix.
4 July—August. Stagnant waters.

3 P Pauciflorum. *Stem* branching, diffuse. *Leaves* linear, sessile, the upper verticillate, the lower alternate. *Spadix* 1 from each whorl of leaves, bearing 4–10 flowers.
4 Through the summer. Shallow water.

Order CXX. JUNCAGINEÆ.

Flowers perfect. *Perianth* 4-6 leaved, or 6-parted, rarely wanting. *Stamens* 3–6, hypogynous. *Ovaries* 3 or 6, cohering. *Ovules* 1 or 2, erect. *Fruit* dry, 1 or 2-seeded. Herbaceous plants, growing in bogs. *Leaves* ensiform, flowers in spikes, or racemes.

Genus I TRIGLOCHIN.

Perianth 6-leaved. *Stamens* 3–4. *Stigmas* 3. *Capsules* 3–4, opening at the base. *Seed* solitary.

1 T Triandrum. *Leaves* terete, linear, as long as the scape, erect, sheathing; scape terete. *Flowers* numerous. *Anthers* sessile. *Capsules* 3–4, united by a spongy membrane.
July—August. In sands on the coast. 6 in.

Order CXXI. PISTIACEÆ.

Flowers 2, enclosed in a spathe. *Stamens* 2–7. *Ovary* 1-celled, with 1 or more erect ovules. *Style* 1, short. *Fruit* indehiscent, 1 or more seeded. *Seeds* with a fungus integment. Floating plants, with cellular, lenticular, or lobed stems and leaves.

Genus I LEMNA.

Flowers monœcious, with the sterile and fertile flowers collateral. *Stamens* 2. *Capsule* 1-celled, 1–5 seeded.

1 L Minor. A small floating plant. *Leaves* eliptic, flat, bearing flowers, in clefts, on the margins of the leaves or fronds. *Root* solitary. Plants increasing by gemmæ.
☉ July—Aug. In stagnant waters.

2 L Polyrrhiza. *Leaves* eliptic, flat, cohering at the base, compressed, succulent, of a firm texture. *Root* a bundle of 8–10 simple fibres, in the middle of the leaf.
☉ June—July. In stagnant waters.

Genus II PISTIA.

Perianth a tubular, cucullate spathe, strap shaped. *Stamens* 3--8. *Capsule* 1 celled, many seeded.

1 P Spathulata. A floating plant. *Leaves* all radicle, abruptly narrowed into a petiole, dilated, round and obtuse towards the summit. *Flowers* solitary, sub-sessile.
White. ☉ May—Aug. In stagnant waters.

Sub-Class III. GLUMACEÆ.

Flowers destitute of a true perianth, the floral envelops consisting of imbricated bracts, which are alternate instead of verticillate, as in all preceding flowers.

Order CXXII. GRAMINEÆ.

Flowers usually perfect, sometimes monœcious or polygamous, the exterior floral envelops called *glumes*, the interior ones *paleæ*, and the innermost at the base of the ovary, *scales*. *Glumes* usually 2, sometimes single, usually unequal. *Paleæ* 2, the exterior one simple; the interior or uppermost usually keeled. *Scales* 2 or 3, sometimes wanting. *Stamens* hypogynous, 1–6. *Anthers* versatile. *Ovary* simple. *Styles* 2, rarely 1, or 3. *Stigmas* hairy, or plumose. *Albumen* farinaceous. *Embryo* on one side of the albumen. *Culms* cylindrical, fistular, jointed. *Leaves* with a split sheath.

(*a*) *Agrastideæ*.

Involucre panicled. *Spikelets* solitary, 1-flowered. *Glumes* and *Paleæ* of similar texture, usually keeled.

Genus I AGROSTIS.

Glume naked beardless, 2-valved, 1-flowered; valves longer than the paleæ. *Paleæ* 2, membraneous. *Stigmas* longitudinally hispid.

1 A Arachnoides. *Stem* erect, slender, glabrous. *Leaves* with the sheath as long as the joints. *Stipules* lacerate. *Panicle* long, with capillary branches. The upper *Palea* awned, with the awn very slender. *Stamens* 1–3. *Styles* 2.
♃ April—May. Middle Car. 4–8 in.

2 A Tenuiflora. *Stem* nearly simple, decumbent, terete, leafy, pubescent about the joints. *Leaves* flat, scabrous. *Sheaths* longer than the joints. *Panicle* filiform. *Paleæ* longer than the glume. *Awns* long.
♃ Aug.—Sept. Upper Carolina. 3–4 ft.

3 A Sericeæ. *Trichochloa Capillaris*. *Stem* erect, slender. *Leaves* subulate, glabrous, involute. *Panicle* long, diffuse. *Peduncles* purple. *Glume* shorter than the corolla, with the valves awned, purple. *Paleæ* the exterior one lanceolate, 3-awned, with the intermediate awn longest, purple, when young the valve is unawned.
♃ Sept.—Oct. Common. 2–3 ft.

4 A Trichopodes. *Stem* erect, glabrous. *Leaves* flat, scabrous. *Sheath* glabrous, with long stipules. *Panicle* diffuse. *Peduncles* capillary, long. *Glumes* much shorter than the paleæ. The exterior palea with a short, straight awn, the interior longest.
♃ Sept.—Oct. Common. 2–3 ft.

5 A Decumbens. *Stem* geniculate, decumbent, branching, taking root at the joints. *Leaves* flat, scabrous. *Stipules* ovate, membranous. *Panicle*

with the branches nearly verticillate, expanding. *Glumes* acute, the exterior largest. *Paleæ* much shorter than the glumes, unawned.

♃ May—June. In the low country. 1-2 ft.

6 A ALBA. *Stem* geniculate, assurgent, terete, glabrous. *Leaves* nerved, scabrous. *Stipules* ovate, membranaceous. *Panicle* lax, the branches usually by pairs, and verticillate. *Glumes* nearly equal, the exterior somewhat shortest. *Paleæ* with the exterior valve lanceolate, shorter than the calyx.

This plant is considered by some, the same as the preceding, but we believe that they are distinct species.

7 A JUNCEA. *Stem* erect, slender, glabrous. *Leaves* glabrous, concave, margins scabrous. *Panicle* with verticillate branches, about 6 in a whorl. *Glumes* glabrous, the exterior much smaller than the interior, both purple.—*Paleæ* nearly equal.

♃ Dry pine barrens, common. 1-2 ft.

8 A CLANDESTINA *Stem* erect, terete, glabrous. *Leaves* scabrous on the upper surface, with serulate margins. *Sheaths* shorter than the joints, hairy at the throat. *Panicles* appressed, terminal and axillary. *Glumes* glabrous, unequal. *Paleæ* hairy, with the exterior one keeled.

♃ Sept.—Oct. Sandy soils. 3-4 ft.

9 A INDICA. *Stem* erect, terete, glabrous. *Leaves* long, attenuate, erect. *Sheaths* glabrous, shorter than the joints. *Panicle* consisting of erect, lateral racemes. *Glumes* lanceolate, the exterior largest. *Paleæ* twice as long as the glumes.

♃ July—Oct. Common. 2-3 ft.

10 A VIRGINICA. *Stem* procumbent, assurgent, glabrous. *Leaves* subulate, short, entire. *Panicle* appressed. *Glumes* the exterior shorter than the paleæ, keeled, the interior larger. *Paleæ* nearly equal, the exterior acute, the interior obtuse.

♃ Aug.—Sept. On the sea coast. 6-8 in.

11 A PAUCIFLORA. *Stem* erect, glabrous. *Leaves* linear, villous. *Sheaths* striate, with short stipules. *Panicle* with filiform branches. *Glume* unequal, with short awns. *Paleæ* villous, with short awns.

♃ July. Mountains. 12-18 in.

12 A CINNA. *Cinna Arundinacea*. *Stem* erect, glabrous. *Panicle* large, weak. *Leaves* broad, linear, 1-valved, slightly awned beneath the summit.

♃ Aug. Middle Georgia.

13 A LATERIFLORA. *Stem* erect, branching above. *Leaves* broad, linear, flat. *Panicles* lateral and terminal, dense, somewhat secund. *Glumes* acuminate. *Paleæ* longer than the glumes, equal, pubescent at the base, without awns.

♃ Aug.—Sept. Swamps. 2-2 feet.

GENUS II TRICHODIUM.

Glumes 2, 1-flowered. *Palea* 1, shorter than the glumes, bearded, and supported at the base by fasicles of hairs. *Flowers* in capillary panicles.

1 T LAXIFLORUM. *Stem* erect, glabrous. *Leaves* setaceous, scabrous.—*Panicles* diffuse, capillary, with trichotomous branches. *Glumes* unequal, lanceolate, acute. *Paleæ* shorter than the glumes, with the margins pubescent.

♃ March—May. Dry fields, or swamps. 18 in.—3 ft.

2 T PERENNANS. *Stem* decumbent, slender, glabrous. *Leaves* slightly scabrous. *Sheaths* longer than the joints. *Panicle* diffuse. *Glumes* nearly equal, acute. *Paleæ* shorter than the glumes, acute.

♃ Sept.—Dec. Shady places. 12-18 in.

Genus III MUHLENBERGIA.

Glumes 2, very minute fringed. *Paleæ* ovate, gibbous, much larger than the glumes, the lower one awned. *Panicle* simple.

1 M Diffusa. *Stem* decumbent, geniculate, diffuse, compressed. *Leaves* linear, scabrous. *Panicle* slender, composed of alternate, appressed racemes. *Glumes* unequal, small. *Paleæ* unequal, pubescent at the base, the exterior 3-nerved, awn purple.
♃ July. Fields. 18–20 in.

2 M Erecta. *Stem* erect, simple, pubescent. *Leaves* pubescent. *Sheath* shorter than the joint, hairy at the throat. *Panicle* loose. *Glumes* with one very minute. *Paleæ* with the exterior one bearing a long awn, many nerved.
♃ July. Rocky hills. 2–3 feet.

Genus IV ALOPECURUS.

Glumes 2, 1-flowered, nearly equal. *Paleæ* united, cleft on one side below the middle. *Styles* often connate.

1 A Geniculatus. *Stem* geniculate, ascending, glabrous. *Leaves* glabrous. *Sheaths* shorter than the joints, glabrous. *Panicle* composed of cylindrical spikes. *Glumes* compressed, connate at the base, pubescent. *Paleæ* truncate, glabrous, with an awn at the base.
♃ March. In rice fields, common. 12–18 in.

Genus V PHLEUM.

Glumes 2, equal, mucronate, longer than the paleæ. *Paleæ* 2, included in the glume, truncate, boat shaped, without awns. *Flowers* in dense, cylindrical spikes.

1 P Pratense. *Stem* erect, glabrous, simple. *Leaves* flat, linear-lanceolate. *Sheaths* longer than the joints. *Glumes* equal, hairy, ciliate *Paleæ* smaller than the glumes. *Herds Grass.*
♃ June—July. Introduced into the Southern states. 2–3 ft.

Genus VI PHALARIS.

Glumes 2, nearly equal, membranaceous, keeled, 1-flowered. *Paleæ* 2, coriaceous, pubescent at the base, shorter than the glumes. *Scales* 2, opposite, ovate, lanceolate. *Flowers* in compound spikes.

1 P Americana. *Stem* erect, branching, scabrous near the summit, geniculate near the base. *Leaves* glabrous. *Sheath* shorter than the joints.—*Style* 1, bifid. *American canary grass.*
♃ July—Aug. Swamps 2–5 ft.

B. PANICEÆ.

Glumes usually 2-flowered, one of the flowers sterile. *Paleæ* cartilaginous, thicker than the glumes, the lower one partly enclosing the upper, neither of them keeled.

Genus VII PANICUM.

[The first eleven species of this genus would constitute the genus *Setaria*, but as that genus differs from the *Panicum* only by having the flowers in spikes, we do not deem it of sufficient importance to alter the arrangement from that to which we have been accustomed.]

Glumes 2, unequal, the lower one very small; the lower florets usually abortive, or bearing stamens only. *Paleæ* concave, equal, beardless. *Seed* coated with the paleæ. *Flowers* in loose, scattered panicles or spikes.

1 P Cenchroides. *Stem* erect, scabrous near the summit. *Leaves* scabrous, contracted at the throat. *Flowers* in a compact, rigid spike. *Involucre* many cleft, with the exterior segments short. *Glumes* nearly equal nerved, with an accessory glume of half their length. *Paleæ* longer than the glumes.

4.

2 P Lævigatum. *Stem* procumbent, compressed, the upper joints longest. *Leaves* narrow, glabrous. *Sheaths* compressed. *Spike* columnar; spikelets 1-flowered. *Involucels* 10-awned.

4 Through the summer. Sea islands 1–2 ft.

3 P Corrugatum. *Stem* erect, terete, slightly scabrous. *Leaves* acute, scabrous. *Sheaths* longer than the joints. *Flowers* in compound, compact spikes; spikelets with about half the flowers fertile, the others sterile. *Glumes* with an accessory valve, 5-nerved. *Paleæ* as long as the glumes, the exterior one wrinkled.

4 Through the summer. Low country. 2–3 ft.

4 P Crus Galli. *Stem* erect, terete, glabrous. *Leaves* long, scabrous. *Flowers* on spikes forming a terminal panicle. *Rachis* angled, hairy.—*Glumes* 2-flowered, one perfect, the other sterile; exterior glume with a long awn, the interior one flat, awned, the accessory glume very small. *Paleæ* pubescent.

⊙ Aug.—Sept. Cultivated grounds. 2–4 ft.

The glumes of this species are not always awned, and the awns vary very much in length.

5 P Walteri. *Stem* erect, slender, glabrous. *Leaves* horizontal, glabrous, throat of the sheath ciliate. *Flowers* in alternate spikes, in 3 rows. *Rachis* scabrous. *Glumes* 2-flowered, perfect and sterile.

⊙ Through the summer. In damp soils. Low country. 2–3 ft.

6 P Hirtellum. *Stem* procumbent, creeping, sometimes assurgent, hairy at the joints. *Leaves* undulate, scabrous, slightly hairy, contracted at the base, throat and margin of the sheath hairy, spikes compound; spikelets 5–8-flowered. *Rachis* angled, villous *Glumes* 1-flowered, with purple awns.

4 August—Oct. Rich dry soils.

7 P. Gibbum. *Stem* erect, glabrous. *Leaves* linear-lanceolate, pubescent. *Flowers* in appressed racemes. *Glumes* 2-flowered, perfect, and sterile. *Paleæ* of the perfect flower about half the length of the glumes.

⊙ Through the Summer. Damp soils common. 1–2 ft.

8 P Mollie *Stem* erect, pubescent towards the summit, and all the joints. *Leaves* glabrous with the throat of the sheath ciliate. *Flowers* in spikes or racemes. *Glumes* 2-flowered perfect, and sterile; valves acute, hairy. *Palea* of the sterile floret 1.

4 August—Sept. On the sea islands. 4–6 ft.

9 P Gymnocarpon *Stem* erect, glabrous. *Leaves* cordate, long. *Sheaths* about the length of the joints, striate. *Flowers* in simple panicles in two rows on one side of the branches; spikelets 3–5 flowered. *Glumes* 3. *Paleæ* about half the length of the glumes

4 August—Sept. Low country. 2–4 ft.

(b) Flowers in panicles, either solitary or in racemes.

10 P Glaucum. *Stem* erect, glabrous, slightly compressed. *Leaves* linear-lanceolate, acute, upper surface scabrous; spike cylindrical. *Glumes* with an accessory one, acute, 3-nerved. *Paleæ* 2, the exterior one, obscurely 5-nerved. *Awns* 8–10, in 2 fascicles.

⊙ July—Aug. Roadsides. 2 ft.

There are two or three varieties of this plant, varying in the direction of the stem, and in the number of the flowers in the spikelets, and in being pubescent.

11 P Italicum. *Stem* erect, slightly compressed, tomentose. *Leaves* very long, channeled, scabrous, the sheath with the throat and margins ciliate; spikes compressed, with the spikelets many flowered. *Involucre* longer than the flowers. *Glumes* 2-flowered, only one palea to the sterile floret.

♃ August—Sept. Wet soils. 2–10 ft.

12 P Geniculatum. *Stem* assurgent, geniculate, branching, large. *Leaves* long, hairy, and scabrous on the upper surface, glabrous beneath. *Flowers* in large panicles, diffuse. *Glumes* 1 flowered.

♃ August—Oct. Wet soils. 3–6 ft.

13 P Anceps. *Stem* compressed, branching, geniculate. *Leaves* hairy. *Sheaths* hairy, longer than the joints. *Panicle* expanding, turning to one side. *Glumes* 2–3-flowered, perfect and sterile. *Paleæ* shorter than the calyx.

♃ August—Nov. Wet soils, common. 2–4 ft.

14 P Hians. *Stem* slender, decumbent, glabrous. *Leaves* linear, ciliate, near the base. *Sheaths* short, contracted and pubescent at the throat. *Flowers* in racemose panicles. *Glumes* ovate, acute, 2 flowered. *Valves* of the sterile floret long, of the fertile ovate cartilaginous.

⊙ August—Oct. Pine barrens, common. 10–15 in.

15 P Latifolium. *Stem* procumbent, pubescent. *Leaves* ovate-lanceolate, hairy at the throat. *Flowers* solitary, scattered. *Glumes* 2-flowered, perfect and sterile, pubescent. *Paleæ* of the perfect flowers larger than those of the sterile ones.

♃ Through the Summer. Dry shady soils, common. 12–15 in.

14 P Scoparium. *Stem* erect, villous. *Leaves* glabrous on the upper surface, 3–6 inches long, 1–2 wide, pubescent beneath. *Flowers* few, large. *Glumes* 2-flowered, pubescent, with an accessory valve. *Paleæ* of the perfect floret larger than those of the sterile one.

♃ April—May. Shady places. 2–3 ft.

17 P Pauciflorum. *Stem* erect, geniculate, branching at the joints. *Leaves* narrow-lanceolate, acute, ciliate at the base. *Sheaths* hairy. *Flowers* large, solitary, few. *Glumes* 1-flowered, with an accessory valve.

♃ May- Damp soils. 12–18 in.

18 P Virgatum. *Stem* erect, glabrous. *Leaves* somewhat serrulate, long. *Sheaths* shorter than the joints. Panicle large, with the branches often verticillate. *Glumes* 2-flowered, perfect and sterile with an accessory valve.

♃ August—Sept. Sea coast. 4–6 ft.

19 P Amarum. *Stem* erect, stout, glabrous. *Leaves* flat, thick, throat of the sheath contracted, purple. *Panicle* large. *Flowers* large. *Peduncles* glabrous. *Glumes* 2-flowered tinged with purple. *Paleæ* nearly equal in both flowers.

♃ October. Sand hills on the sea coast. 2–3 ft.

20 P Scabriusculum. *Stem* erect, large, somewhat pubescent, scabrous. *Leaves* lineal-lanceolate, pubescent beneath, serrulate. *Sheaths* pubescent, hairy at the throat. *Panicles* large, expanding. *Peduncles* glabrous. *Glumes* 2-flowered, perfect and sterile.

♃ Sept.—Oct. Low country of Ga. 2–3 ft.

21 P Nervosum. *Stem* erect, glabrous. *Leaves* lanceolate, slightly cordate, ciliate at the base, distinctly nerved. *Panicle* diffuse. *Peduncles* pubescent. *Glume* 2-flowered.

♃ May—July. Dry soils. 2–3 ft.

22 P Multiflorum. *Stem* erect, glabrous. *Leaves* broad-lanceolate, pubescent at the base, and ciliate, slightly undulate. *Flowers* in a much branched panicle, small, pubescent.
♃ May—July. Shaded soils. 2–3 feet.

23 P Ovale. *Stem* erect, pubescent, terete. *Leaves* ovate-lanceolate, cordate, hairy at the base. *Sheath* contracted at the throat. *Flowers* numerous, oblong, hairy.
♃ August—Sept. Middle and Southern Ga. 1–2 ft.

24 P Languinosum. *Stem* pubescent, whitish. *Leaves* linear, acute, downy. *Sheaths* languinous at the throat. *Panicle* diffuse. *Flowers* small, nearly globular. *Peduncles* smooth.
♃ July—Sept. Middle Ga. 1–2 ft.

25 P Viscidum. *Stem* erect and decumbent, branching, very pubescent, and viscid at the joints. *Leaves* slightly cordate, pubescent, ciliate. *Sheath* viscid. *Panicle* expanding. *Flowers* pubescent, obovate. *Glumes* 2-flowered. *Paleæ* of the sterile floret very small.
♃ June. Damp soils. 2–4 ft.

26 P Dichotomum. *Stem* procumbent, geniculate, pubescent, branched towards the summit. *Leaves* pubescent, serrulate. *Sheath* pubescent. *Flowers* small. *Glumes* 2-flowered.
♃ June—Oct. Pastures and woods, common. 1–2 ft.

27 P Villosum. *Stem* erect, villous, somewhat branched. *Leaves* erect, hairy, rigid. *Sheaths* shorter than the joints. *Flowers* few, obovate. *Glumes* 1-flowered, obovate.
♃ April—May. Damp places. 1–2 ft.

28 P Sphærocarpon. *Stem* erect, terete, glabrous. *Leaves* linear-lanceolate, acute, glabrous, ciliate at the base. *Panicle* expanding. *Flowers* small, pubescent. *Fruit* globular.
♃ April—May. Middle Ga. 12–18 in.

29 P Pubescens. *Stem* erect, much branched, pubescent. *Leaves* lanceolate, ciliate, pubescent. *Stipules* bearded. *Glumes* 2-flowered, obovate. *Paleæ* of the perfect flower longest.
♃ July—Aug. Shady woods. 1–2 ft.

30 P Strictum. *Stem* assurgent, branched, villous. *Leaves* lanceolate, ciliate, villous. *Panicles* large. *Glumes* 2-flowered, obovate. *Paleæ* of the sterile florets very small.
♃ April—May. Damp soils. 12–15 in.

31 P Ciliatum. *Stem* decumbent, terete, glabrous. *Leaves* lanceolate, ciliate. *Sheath* glabrous, ciliate. *Glumes* 2-flowered, with an accessory glume. *Paleæ* of the neutral floret small.
♃ March—April. Damp soils. 4–10 in.

32 P Ensifolium. *Stem* erect, slender. *Leaves* ovate-lanceolate, acute, glabrous. *Sheath* short, glabrous. *Flowers* small pubescent.
♃ April—May. Damp soils. 12–18 in.

33 P Barbulatum. *Stem* erect, usually geniculate, with the joints bearded, branching at the base. *Leaves* ovate-lanceolate, glabrous, expanding. *Sheath* glabrous, ciliate. *Glumes* 2 flowered, pubescent. *Paleæ* of the perfect flower equaling the glumes; of the sterile flower only one, small.
♃ April—July. Damp soils. 10–15 in.

34 P Microcarpon. *Stem* erect, simple. *Leaves* linear-lanceolate, erect, slightly pubescent beneath. *Sheaths* hispid, hairy at the throat. *Glumes* tinged with purple.
♃ June—July. Banks of streams. 2–3 ft.

35 P Nitidum. *Stem* erect, slender, glabrous. *Leaves* linear-lanceolate, expanding. *Sheaths* shorter than the joints, hairy at the throat. *Flowers* in a diffuse panicle, nearly spherical, small. *Glumes* purple.
♃ April—May. Damp soils. 1–2 ft.

36 P Melicarium. *Stem* slender, glabrous. *Leaves* long, narrow, gla-

brous. *Panicle* contracted, slender. *Glumes* 2-flowered, membranous, nearly equal.

♃ April—June. Car. & Ga.

37 P Debile. *Stem* slender, decumbent, branching glabrous. *Leaves* long, serrulate. *Sheaths* ciliate, hairy at the throat. *Glumes* lanceolate, glabrous. *Flowers* in slender diffuse panicles. *Pedicels* 2-flowered.

♃ August—Oct. Damp soils. 2–4 ft.

38 P Angustifolium. *Stem* slender, glabrous. *Leaves* linear lanceolate, ciliate at the base, scabrous above, glabrous beneath. *Flowers* solitary, pubescent.

♃ May—June. Shaded soils. 1–3 ft.

39 P Divergens. *Stem* assurgent, slender. *Leaves* subulate, glabrous on the under surface, scabrous above. *Sheaths* scabrous, longer than the joints. *Flowers* solitary, on long peduncles. *Glumes* 1-flowered, with a subulate accessory glume. *Paleæ* shorter than the glumes.

♃ June—August. Dry soils. 12–15 in.

Genus VIII DIGITARIA.

Inflorescence digitate, or fascicled; spikelets in pairs, on short bifid peduncles, arranged on one side of the rachis. *Glumes* 3, the lower one very minute, the lower floret sterile, the upper perfect. *Paleæ* of the perfect floret sub-coriaceous.

1 D Sanguinalis. *Stem* decumbent, and assurgent, geniculate, taking root at the joints. *Leaves* hairy with sheaths shorter than the joints, hairy, sometimes purple. *Spikes* digitate, spreading, 4–6. *Glumes* glabrous, exterior ones small. *Paleæ* with the valves equal, lanceolate. *Crab grass.*

⊙ Through the Summer. Cultivated grounds very common.

2 D Villosa. *Stem* columnar, hairy at the joints, geniculate, forming dense tufts. *Leaves* linear-lanceolate, villous. *Sheaths* villous; spikelets 3-flowered. *Glumes* pubescent, the exterior one very small.

⊙ June—Aug. Wet places, common.

3 D Filiformis. *Stem* erect, glabrous. *Leaves* narrow-lanceolate, slightly scabrous, and hairy on the upper surface. *Sheath* hairy. *Spikes* alternate, filiform, sometimes very long. *Glumes* pubescent, nearly equal

♃ Sept.—Oct. On poor lands. 1–2 ft.

4 D Paspaloides. Milium Paspaloides of Ell. *Stem* ascending and decumbent, compressed glabrous. *Leaves* ciliate, glabrous, 3–6 inches long. *Spikes* digitate, conjugate. *Glumes* glabrous, ovate-lanceolate, acute. *Paleæ* equal, shorter than the glumes. *Seed* ovate, compressed.

♃ June—Sept. Low country. 1–2 ft.

Genus IX PASPALUM.

Glumes 2, 1-flowered, membranaceous, equal. *Paleæ* 2, equal. *Seeds* coated with the paleæ. *Flowers* in spikes arranged on one side of the rachis.

P P Setaceum. *Stem* erect, slender, glabrous. *Leaves* villous, narrow *Sheath* villous. *Spikes* usually solitary. *Flowers* in two rows. *Peduncle* long *Glume* equal, 3–5 nerved, minutely pubescent.

♃ June—Aug. Dry soils, common.

2 P Ciliatifolium. *Stem* decumbent, compressed, glabrous. *Leaves* broad hairy, and ciliate. *Sheaths* hairy. *Spikes* 2–3, indistinctly 3-rowed. *Glumes* 3-nerved, minutely pubescent.

♃ Sandy fields. July—Oct. 12–18 in.

3 P Præcox. *Stem* erect, glabrous. *Leaves* linear-lanceolate, glabrous. *Spikes* numerous, with the flowers crowded, 2 from each bud, and one of them sessile. *Rachis* hairy at the base. *Glumes* orbicular, glabrous.
♃ May—Aug. Damp soils. 1–2 ft.

4 P Lævε. *Stem* erect, glabrous. *Leaves* short, lanceolate, glabrous, hairy at the throat. *Spikes* 3–6. *Flowers* 1 from each head. *Rachis* little hairy at the base.
♃ June—Sept. Damp pastures. 1–2 ft.

5 P Floridanum. *Stem* erect, glabrous. *Leaves* long, the lower ones hairy and scabrous, the upper ones becoming nearly glabrous. Throat of the sheath villous. *Spikes* generally 3. *Rachis* hairy at the base. *Flowers* 1–2 from each bud.
♃ June—Sept. Common. 3–4 ft.

6 P Purpurascens. *Stem* decumbent, and erect, branching, glabrous.—*Leaves* long, hairy at the base, dark purple. *Spikes* numerous. *Flowers* crowded, 2 from each bud. *Rachis* hairy at the base.
♃ July—Oct. Common. 12–18 in.

7 P Distichum. *Stem* prostrate, creeping, geniculate. *Leaves* short, shining. *Sheath* with the throat hairy. *Spikes* 2–4. *Glumes* lanceolate.
Joint grass.
♃ Through the summer. In damp soils, common.

8 P Vaginatum. *Stem* creeping, glabrous, branching. *Leaves* linear, short, the sheaths of the upper leaves longer than the joints. *Spikes* 1–2, one of them sessile.
♃ Through the summer. Damp soils, low country. 12–18 in.

Genus X CERESIA.

Glumes 2, 1-flowered, with the exterior one longer and bifid at the summit. *Paleæ* 2, a little smaller than the glumes. *Spikes* numerous. *Flowers* in 2 rows, under a wide, membranous rachis.

1 C Fluitans. *Stem* procumbent, creeping, assurgent, glabrous. *Leaves* scabrous, 2–3 inches long, slightly glaucous beneath. *Sheaths* hairy at the base. *Spikes* numerous, 20–30, recurved. *Rachis* with the flowers arranged on the upper surface. *Glumes* dotted, white. *Paleæ* equal, the interior one flat, the exterior convex.
☺ Sept.—November. Swamps. 1–3 ft.

Genus XI AULAXANTHUS.

Glumes equal, lanceolate, 1-flowered, nerved. *Paleæ* 2, nearly equal, the exterior concave, the interior flat.

1 A Ciliatus. *Stem* erect, glabrous. compressed towards the base.—*Leaves* linear, ciliate, glabrous. *Sheath* ciliate, hairy at the throat. *Glumes* villous. *Paleæ* brown, nearly black when mature.
♃ Sept—Oct. Pine barrens. 1–2 ft.

2 A Rufus. *Stem* erect, larger than the preceding. *Leaves* glabrous. *Panicle* large. *Glumes* covered with long, reddish brown hair.
♃ Aug.—Sept. Damp soils. 2–3 ft.

Genus XII CENCHRUS.

Involucre 1–3-flowered, many parted, bristly. *Glumes* 2, 2-flowered, exterior ones smallest, the exterior floret sterile, the other perfect. *Paleæ* 2, unawned.

1 C ECHINATUS. *Stem* erect, or pubescent. *Spikes* consisting of 6–10 heads; spikelets approximate. *Involucre* 10-parted, villous.
☉ Aug.—Sept. Sandy soils. 1–2 ft.

2 C TRIBULOIDES. *Stem* erect, compressed, sometimes branched. *Leaves* scabrous on the upper surface, glabrous beneath. *Sheath* twice the length of the joints. *Glumes* unequal, 2-flowered. *Paleæ* 2, the exterior valve acute.
☉ July—Oct. Sandy soils. 12–15 in.

GENUS XIII TRIPSACUM.

Flowers monœcious. *Sterile florets.* *Stamens* 3. *Glumes* 2, 2-flowered, outer one sterile, the interior neuter. *Palea* 1, membranous. *Fertile flowers.* *Glumes* 2, 1-flowered, surrounded by an involucre. *Paleæ* 2. *Styles* 2. *Seed* 1.

1 T DACTYLOIDES. *Stem* erect, glabrous, more or less compressed. *Leaves* large, contracted at the base. *Sheath* villous at the throat. *Flowers* in 3-clustered spikes, the upper florets sterile, the lower fertile, generally 2–4.
♃ July—Aug. On dry soils. 5–7 ft.

2 T MONOSTACHYON *Stem* erect, glabrous, compressed. *Leaves* large, serrulate, contracted at the base. *Flowers* in a solitary, terminal spike, upper florets sterile, the lower fertile.
♃ Aug.—Oct. Along the sea cost. 3–5 ft.

C. STIPACEÆ.

Inflorescence panicled, consisting of one flowered, solitary spikelets.

GENUS XIV STIPA.

Glumes 2, membranous, 1-flowered. *Paleæ* 2, coriaceous, shorter than the glumes, the lower one with a long terminal awn, the upper one entire. *Panicle* lax.

1 S AVENACEA. *Stem* erect, terete, glabrous, lower leaves longest, glabrous beneath, scabrous on the upper surface. *Flowers* in diffuse panicles. *Glumes* nearly equal, concave, sometimes awned. *Paleæ* stiped, the stipe bearded. *Awn* spiral. *Feather grass.*
♃ June. Sandy soils, common. 2–3 ft.

D. BROMEÆ.

Inflorescence panicled, consisting of solitary spikelets or racemes, 2, or many flowered. *Glumes* keeled. *Paleæ* resembling the glumes, the lower one keeled, or concave, bearded, the upper with 2 keels.

GENUS XV ARISTIDA.

Glumes 2, membranaceous, unequal. *Paleæ* 2, on pedicels, lower one coriaceous, 3-awned, the upper one very small, or wanting. *Scales* collateral.

1 A DICHOTOMA. *Stem* slender, branching, glabrous. *Leaves* narrow, flat

finely serrulate. *Flowers* in paniculate racemes. *Glumes* narrow lanceolate, with short awns, keels serrulate. *Palea* involute, 3-awned, the middle one longest, contorted.

♂ July. Loose soils. 12–18 in.

2 A Stricta. *Stem* erect, compressed, branching at the base, lower joints short. *Leaves* glabrous. *Sheaths* longer than the joints, with the throat ciliate. *Panicle* long, erect. *Peduncles* scabrous. *Glumes* unequal, with serrulate keels. *Palea* with the exterior one hairy at the base. *Awns* long, scabrous.

4 July—Aug. Rocky soils. 2–3 ft.

3 A Spiciformis. *Stem* erect, simple, compressed. *Leaves* linear. *Sheaths* glabrous. *Flowers* in compound racemes, appressed. *Glumes* shorter than the palea, terminated by awns. *Palea* unequal, exterior one 3-awned, with the intermediate one longest, pubescent at the base.

4 Sept.—Oct. Pine barrens. 1–3 ft.

4 A Gracilis. *Stem* erect, slender, glabrous, branching at the base. *Leaves* linear, with sheaths shorter than the joints. *Flowers* in long spikes, appressed. *Glumes* equaling the palea in length, the exterior palea involute, banded with light and dark spots, 3 awned, the interior palea minute, or wanting.

4 Sept.—Oct. Common on the sea coast. 10–15 in.

5 A Lanosa. *Stem* erect, pubescent at the base. *Leaves* glabrous beneath, pubescent above, with scabrous margins. *Sheaths* tomentose. *Flowers* in racemose panicles. *Glumes* acute, compressed, unequal, exterior palea 3-awned, involute, the interior one very small.

4 August—Sept. Sandy soils. 2–4 ft.

Genus XVI CALAMAGROSTIS.

Glumes 2, 1-flowered, acute. *Palea* 2, shorter than the glumes, surrounded by a woolly pubescence at the base, dorsal one sometimes awned.

1 C Americana. Phalaris Americana of Ell. *Stem* erect, branching, geniculate at the base with summit somewhat scabrous. *Leaves* glabrous, linear-lanceolate; sheath shorter than the joints. *Glumes* compressed, with the keel serrulate; the interior one longest. *Palea* with 2 minute accessory valves.

☺ April—May. Damp soils.

Genus XVII ANTHOXANTHUM.

Glumes 2–3-flowered, lateral florets imperfect, with one palea bearded, intermediate florets perfect, shorter than the lateral ones. *Palea* obtuse. *Stamens* 2. *Styles* 2. *Panicle* contracted.

1 A Odoratum. *Stem* erect, scabrous at the summit. *Leaves* linear, hairy. *Sheath* striate, pubescent at the throat. *Flowers* in appressed panicles. *Glumes* acute, membranaceous, hairy, the interior one twice as long as the other. *Palea* equal, villous, with an awn at the base of each. *Styles* 2, filiform. **Sweet scented Vernal grass.**

4 May—June. Common in the low country. Introduced. 12–15 in.

Genus XVIII. AIRA.

Glumes 2, 2–3-flowered. *Palea* 2-equal, enclosing the seed, exterior one usually awned. *Panicle* compound.

1 A Pallens. *Stem* erect, geniculate at the base, glabrous. *Leaves* flat, slightly scabrous, narrow. *Sheaths* glabrous. *Glumes* compressed, keeled, the interior valve longest. *Paleæ* 2, the exterior double the length of the interior, bearing a short awn on the back.
♃ March—April. Wet soils, common. 1-2 ft.

2 A. Flexuosa. *Stem* erect, terete, glabrous. *Leaves* setaceous. *Panicle* diffuse, with the branches somewhat verticillate. *Glumes* unequal. *Paleæ* equal, the exterior one pubescent at the base, bearing an awn at the base.
♃ August—Sept. Shady woods. 1-2 ft.

3 A Purpurea. *Stem* slender, compressed, scabrous at the joints. *Leaves* scabrous, pubescent on the upper surface. *Sheaths* scabrous, the throat pubescent. *Glumes* 2-flowered, the exterior valves small, with the margins incised. *Paleæ* 2, the exterior one bifid, with the midrib extending into an awn, the interior valve villous.
☉ Sept.—Oct. Sea coast. 1-2 ft.

4 A Capillacea. *Stem* erect, small. *Leaves* short, glabrous, narrow. *Flowers* in capillary panicles, diffuse, large for the size of the plant. *Glumes* acute, with the keel rough. *Paleæ* unawned, larger than the glumes.
☉ July—Aug. Sandy soils. 8-10 in.

5 A Triflora. *Stem* erect, glabrous, slender *Leaves* short, flat, scabrous on the under surface. *Sheaths* shorter than the joints with incised stipules. *Glumes* unequal, linear lanceolate, keeled. *Paleæ* lanceolate, 3-5-nerved.
♃ April—May. Upper Car. & Ga. 12-18 in.

6 A Obtusata. *Stem* erect, glabrous. *Leaves* flat, somewhat scabrous and hairy. *Sheaths* hairy. *Panicle* racemose. *Glumes* 2-3-flowered, the exterior one linear, the interior broad, obtuse. *Paleæ* nearly equal, the exterior tinged with green, the interior white.
♃ March—April. Pine barrens, common.

7 A Mollis. *Stem* slender, glabrous, naked at the summit. *Leaves* linear, short. *Flowers* in racemose panicles, scattered. *Glumes* with the interior obtuse, the exterior acute. *Paleæ* acute, the interior shortest, usually 2-cleft.
♃ April—May. Middle Car. & Ga. Common. 1-2 ft.

Genus XVIII. AVENA.

Glumes 2, 2-7-flowered, longer than the florets. *Paleæ* bilaciniate, or with the upper bifid toothed, with a twisted awn on the back. *Seed* furrowed. *Panicle* loose compound.

1 A Spicata. *Stem* erect, pubescent, near the summit. *Leaves* subulate, small, pubescent. *Sheath* with the throat bearded, villous. *Flowers* panicled. *Spikes* racemose, on short pedicels. *Glumes* usually 6-flowered, longer than the spike, margins membranous. *Paleæ* 2, exterior one lanceolate, villous, the sides terminating in two awns, with the spiral one on the back, between them, interior one ciliate.
♃ April—May. Upper districts of Car. & Ga. 1-2 ft.

2 A Pennsylvanica. Resembles the preceding with the exception that the glumes are 2-flowered, and seeds villous.

Genus XIX ARUNDO.

Glumes 2, naked, unequal, about 5-flowered. *Paleæ* 2, unequal, surrounded by bristles at the base, lower one mucronate, or slightly awned. *Style* 1.

1 A Phragmites. *Stem* erect, jointed, branching towards the summit.—*Leaves* lanceolate, flat, pubescent on the under surface. *Panicle* large, loose,

terminal, somewhat nodding. *Peduncles* pubescent. *Glumes* shorter than the paleæ, valves unequal. *Paleæ* unequal, the exterior largest. *Stamens* 3. *Style* short. *Reed grass.*

♄ March—April. Rich, damp soils. 3–15 ft.

Genus XX FESTUCA.

Glumes 2, unequal, many flowered. *Paleæ* 2, lanceolate, outer one acuminate, or awned. *Panicle* usually compound.

1 F Tenella. *Stem* erect, geniculate at the base. *Leaves* subulate, pubescent and scabrous on the upper surface *Panicle* secund, simple; spikelets 6–9-flowered. *Glumes* unequally scabrous. *Paleæ* longer than the glumes, exterior valve keeled, awned.

☺ April—May Dry soils, common. 6–12 in.

2 F Polystachya. *Stem* procumbent, branching, glabrous. *Leaves* narrow, subulate. *Sheaths* longer than the joints. *Panicle* secund, erect; spikelets about 10-flowered, the exterior glume small, the interior larger and awned, the exterior paleæ awned and keeled.

♃ Sept.—Oct. Wet soils. 1–2 ft.

3 F Myuros. *Stem* erect, geniculate at the base, glabrous. *Leaves* subulate, scabrous on the margins. *Sheaths* much longer than the joints. *Panicle* slender, crowded, not secund; spikelets 4–7, flowered. *Glumes* small, exterior palea concave hairy, awned.

☺ March—April. Dry soils. 6–12 in.

4 F Parviflora. *Stem* slender, glabrous. *Leaves* linear, almost filiform. *Panicle* slender; spikelets subulate, terete, 5-flowered, exterior paleæ awned.

♃ April—May. Pine barrens 12–18 in.

5 F Duriuscula. *Stem* erect, glabrous. *Leaves* subulate, scabrous. *Panicle* erect, secund, short; spikelets 6–8-flowered. *Glumes* acute, unequal. *Paleæ* unawned, interior one small.

M June—July. In fields. 12–18 in.

6 F Nutans. *Stem* erect, terete, glabrous. *Leaves* linear-lanceolate, glabrous. *Panicle* secund, nodding; spikelets 6-flowered, compressed. *Flowers* unawned.

♃ June—July. Woods. 2–3 feet.

Genus XXI CERATOCHLOA.

Glumes 6–8-flowered, shorter than the florets. *Paleæ* toothed, the lower one mucronate between the teeth. *Seed* furrowed, 3-horned. *Panicle* nearly simple. *Spikelets* compressed. *Florets* in 2 rows.

1 C Uniloides. *Stem* erect. *Leaves* narrow, the sheaths bearded at the throat, the lower one hairy. *Panicle* nodding, spreading; spikelets oblong-lanceolate, compressed, 6–8-flowered.

☺ July- Fertile soils. 12–18 inches.

Genus XXII DACTYLIS.

Glumes 2, many flowered, unequal, the larger one keeled. *Paleæ* 2, without awns, lanceolate, lower one mucronate, the upper one bifid. *Spikelets* clustered into a 1-seeded head.

1 D Glomerata. *Stem* erect, glabrous. *Leaves* linear, scabrous. *Sheath*

scabrous. *Panicle* secund, clustered. *Glumes* lanceolate, 2–4-flowered. *Paleæ* with the keel ciliate.

♃ June—July. In fields. 2–3 feet.

Genus XXIII BROMUS.

Glumes 2, usually many flowered, shorter than the florets, which are imbricated in 2 rows. Lower palea cordate, emarginate, with an awn sometimes below the summit. *Scales* ovate, smooth.

1 B Secalinus. *Stem* glabrous, swollen at the joints, erect. *Leaves* pubescent on the upper surface, ciliate. *Panicle* erect, or nodding, branched; spikelets oblong-ovate, compressed. *Florets* about 10, distinct, longer than the bristles.

☉ July. Cultivated lands. 2–3 ft.

2 B Ciliatus. *Stem* slender, swollen and hairy at the joints. *Leaves* and *Sheaths* hairy. *Panicle* nodding. *Spikes* slender, cylindrical. *Glumes* pubescent. Exterior palea pubescent, ciliate. *Awn* nearly as long as the valve, interior one much smaller

3 C Purgans. *Stem* erect, glabrous. *Leaves* scabrous. *Sheaths* villous. *Panicle* nodding, diffuse. *Peduncles* hairy; spikelets 4–6-flowered. *Glumes* pubescent, the interior one awned. Exterior palea awned, hairy at the summit.

♃ July—September. Mountains. 1–2 ft.

Genus XXIV POA.

Glumes 2, usually many flowered. *Spikelets* compressed. *Paleæ* sometimes woolly at the base. *Scales* smooth. *Panicle* more or less branching, or scattered.

1 P Capillaris. *Stem* erect, glabrous. *Leaves* linear, hairy, short, flat. *Sheath* longer than the joints, hairy at the throat *Panicle* very large, expanding, capillary; spikelets 3-flowered, ovate. *Glumes* pubescent. *Paleæ* pubescent.

☉ Aug.—Sept. Sandy fields. 1–2 ft.

2 P Tenuis. *Stem* somewhat compressed, much branched, glabrous.—*Leaves* linear, long, scabrous. Throat of the sheath hairy. *Panicle* diffuse, capillary; spikelets 1–3-flowered. *Glumes* glabrous. *Paleæ* glabrous, the exterior one keeled.

♃ Aug.—Sept. Upper Car. 12–18 in.

3 P Hirsuta. *Stem* erect, compressed, glabrous, branching, hairy at the axils. *Leaves* glabrous, long, pubescent at the base. *Sheath* hairy. *Glumes* glabrous, tinged with purple.

♃ Aug—Oct. Dry fields. 1–2 ft.

4 P Parviflora. *Stem* simple, decumbent, compressed, leafy. *Leaves* distichous. flat, glabrous. *Sheath* glabrous. *Panicle* diffuse, capillary; spikelets generally 3-flowered; florets obtuse, caducous.

♃ July, Shady woods. Middle Car. & Ga.

5 P Conferta. *Stem* erect, geniculate, terete, swollen at the joints. *Leaves* glabrous flat. *Panicles* terminal and axillary, erect. *Spikelets* 8-flowered, smooth. Exterior palea with colored veins.

♃ July—August. Middle Car. & Ga. 2–3 ft.

6 P Annua. *Stem* glabrous, procumbent, geniculate. *Leaves* glabrous. *Panicle* diffuse. *Spikelets* usually 4–5-flowered. *Glumes* slightly pubescent.

☉ Feb.—April. Cultivated grounds. 6–8 in.

7 P Autumnalis. *Stem* erect, glabrous. *Leaves* slightly scabrous, flat. *Panicles* diffuse. *Spikelets* generally 3-flowered. *Glumes* unequal; exterior palea obtuse, 5 nerved.

4 August.—Sept. Middle Car. and Ga. 12–18 in.

8 P Viridis. *Stem* erect, oblique at the base, striate, glabrous. *Leaves* glabrous, linear, flat. *Panicle* diffuse, with 3 or 4 branches at each joint. *Glumes* acute, margins scarious, white. *Spikelets* 3–5 flowered, woolly at the base.

4 May—June. Common. 2–3 ft.

9 P Angustifolia. *Stem* glabrous, erect. *Leaves* linear, glabrous, involute, upper ones broadest. *Panicle* crowded. *Spikelets* usually 4-flowered, villous at the base. *Paleæ* tinged with purple, villous at the base.

4 May—June. Common. 1–2 ft.

10 P Tenella. *Stem* decumbent, glabrous. *Leaves* subulate, scabrous on the upper surface. *Sheath* hairy at the throat. *Panicle* expanding, with verticillate branches; exterior palea purple, 3–5-nerved.

☉ Through the Summer. Cultivated grounds, common. 6–12 in.

11 P Pectinacea. *Stem* erect, or oblique *Leaves* erect, hairy at the base. *Sheaths* hairy at the throat. *Panicle* capillary, expanding, pyramidal, hairy in the axils. *Spikelets* 5–10-flowered; interior palea persistent.

☉ July—Aug. Sandy fields. 8–12 in.

12 P Eragrostis. *Stem* geniculate and branching at the base, glabrous. *Leaves* short, linear, glabrous, nerved. *Panicle* spreading, lower branches hairy in the axils. *Spikelets* 9–15-flowered; florets obtuse; exterior palea acute, 5-nerved, transparent.

☉ July—August. Sandy fields. 12–18 in.

13 P Nitida. *Stem* erect, glabrous. *Leaves* linear; throat of the sheath slightly hairy. *Panicle* diffuse, capillary. *Spikelets* 7–9-flowered. *Glumes* compressed; exterior palea 3-nerved, transparent.

☉ Through the Summer. Cultivated lands. 12–18 in.

14 P Refracta. *Stem* erect, terete, glabrous. *Leaves* slightly hairy. *Panicle* diffuse, large. *Spikelets* 15–20-flowered; exterior palea 3-nerved.

4 August–Sept. Damp soils. 2 ft.

15 P Fluitans. *Stem* erect, glabrous. *Leaves* scabrous on the upper surface. *Sheaths* glabrous, with large stipules. *Panicle* branching. *Spikelets* sessile, 9–10 flowered. *Glumes* membranous, smaller than the paleæ; exterior palea 7-nerved, obtuse.

4 May—Aug. Upper districts. 1–2 ft.

16 P Reptans. *Flowers* dioecious. *Stem* decumbent, creeping, branched. *Leaves* subulate, striate, slightly pubescent. *Sheath* hairy at the throat. *Panicle* fascicled. *Spikelets* 12–20-flowered; exterior palea with the midrib green.

☉ Through the Summer. Moist cultivated lands. 6–18 in.

17 P Rigida. *Stem* assurgent, glabrous, rigid. *Leaves* subulate, glabrous. *Panicle* secund. *Spikelets* linear-lanceolate, 3–5–7-flowered. *Glumes* keeled. *Paleæ* rounded, tinged with purple.

4 April—May. Dry soils. 2–4 in.

18 P Quinquefida. *Stem* erect, glabrous. *Leaves* distichous at the base, slightly serrulate. *Sheath* hairy at the throat. *Panicle* expanding. *Spikelets* 5-flowered; exterior palea 3–5-nerved, which extend beyond the margin, hairy at the base.

4 Sept.—Oct. Sandy soils, common. 4 ft.

19 P Ambigua. *Stem* erect, glabrous. *Leaves* linear, glabrous. *Sheaths* bearded at the throat. *Panicle* expanding. *Spikelets* dark purple, sessile.

4 Sept. 2 ft.

Genus XXV UNIOLA.

Glumes numerous, shorter than the florets. *Florets* 3–20,

in two rows. *Spikelets* compressed, the lower palea carinate, mucronate, the upper one subulate. *Scales* emarginate. *Seed* 2-horned.

1 U Paniculata. *Stem* erect, glabrous. *Leaves* long, narrow, entire, glabrous. *Sheaths* hairy at the throat. *Panicle* large. *Glumes* 4–5 many flowered; exterior palea mucronate, 6-nerved, interior one ciliate.
♃ July—Aug. On the sea coast. 4–8 ft.

2 U Spicata. *Stem* erect, terete, glabrous. *Leaves* distichous, subulate, involute. *Panicle* compressed. *Glumes* 2–3, 8–10-flowered.
♃ July—Sept. On the sea coast. 1 ft.

3 U Latifolia. *Stem* terete, glabrous. *Leaves* flat, glabrous, throat of the sheath ciliate. *Glumes* 3, 7–14-flowered, the upper ones sterile, exterior palea many nerved, with the keel ciliate. *Flowers* generally monandrous.
♃ August—Sept. Mountains.

4 U Nitida. *Stem* glabrous. *Leaves* flat, narrow. *Panicles* expanding, few flowered. *Glumes* 3, many flowered. *Flowers* monandrous.
♃ June—July. Middle Ga. 2–5 ft.

5 U Gracilis. *Stem* glabrous, erect. *Leaves* scabrous on the upper surface, linear, flat. *Glumes* 3, 3-flowered. *Panicle* long, erect, with appressed branches. *Flowers* monandrous.
♃ Through the Summer. Very common. 1–2 ft.

Genus XXVI BRIZA.

Glumes 2, many flowered. *Flowers* imbricate, in two rows. *Paleæ* ventricose, lower one embracing the upper. *Seed* beaked. *Panicle* compound, loose, with pendulous branches.

1 B Eragrostis. *Stem* decumbent, geniculate, glabrous. *Leaves* scabrous on the upper surface, liner-lanceolate. *Sheaths* shorter than the joints, bearded at the throat. *Panicle* compound; spikelets cordate at the base.—*Flowers* numerous; exterior palea 3-nerved, acute, the interior one ciliate along the nerves.
☺ June—Nov. Cultivated lands, very common. 12–18 in.

Genus XXVII MELICA.

Glumes 2, unequal, 2-flowered. *Paleæ* 2, unequal; upper florets sterile.

1 M Glabra. *Stem* erect, terete, glabrous. *Leaves* linear with long sheaths. *Flowers* in paniculate racemes. *Racemes* 3–5-flowered. *Glumes* shorter than the paleæ, the interior palea ciliate.
♃ April—May. Mid. Car. & Ga. 2–3 ft.

CHLORIDEÆ.

Inflorescence spiked; spikelets solitary, with the upper floret abortive and different from the rest. *Glumes* keeled; the lower palea with 2 keels, usually bearded.

Genus XXVIII. CYNODON.

Spikes digitate. *Spikelets* 1-sided, in a single row, fili-

form. *Glumes* 2, shorter than the florets. The upper *palea* of the fertile floret bifid, toothed. *Seed* loose.

1 C Dactylon. *Stem* creeping, terete, glabrous. *Leaves* expanding, somewhat hairy, 2–4 inches long. *Sheaths* longer than the joints, hairy, with ciliate stipules. *Spikes* 3–4. *Glumes* nearly equal, keeled. *Bermuda grass.*
4 Trough the summer. Common.

Genus XXIX CHLORIS.

Flowers polygamous. *Glumes* 2, 2-flowered, one of them perfect and sessile, the other staminate. *Paleæ* of the perfect flower 2, awned. *Spikes* by fours, digitate.

1 C Petræa. *Stem* prostrate, branching, assurgent, geniculate. *Leaves* glabrous, with the margins and midrib serrulate. *Glumes* 2, 2-flowered, exterior glume awned, the interior smaller, keeled. *Palea* of the sterile floret concave, obtuse
4 June—Aug. On the sea coast.

Genus XXX MONOCERA.

Flowers polygomous, on one side of the rachis. *Glumes* 2, many flowered, awned below the summit. *Paleæ* of the perfect flower 2-valved, unequal, the exterior one awned below the summit, those of the sterile flower unawned.

1 M Aromatica. *Stem* pubescent, erect. *Leaves* scabrous on the upper surface, glabrous beneath. *Sheaths* shorer than the joints, hairy at the throat. *Spikes* terminal, secund; spikelets in 2 rows. *Glumes* 3 flowered, the exterior glume with an awn projecting from the center of the back, the interior palea small, pubescent. *Toothache grass.*
4 May—July. Pine barrens.

Genus XXXI ELEUSINE.

Flowers on one side of the rachis. *Glumes* 2, unequal, 5–7-flowered. *Palea* 2, obtuse, upper one bifid. *Scales* fimbriate. *Spikes* digitate.

1 E Muricata. *Stem* erect, glabrous. *Leaves* slightly scabrous, with hispid sheaths, larger than the joints. *Panicle* long, with the spikes 4–5 inches long. *Glumes* nearly equal, with colored keels. *Paleæ* unequal, the exterior hairy.
☉ July—Oct. Cultivated lands. 1–3 ft.

2 E Indica. *Stem* decumbent, lucid. *Leaves* linear, with the under surface glabrous, long. *Sheaths* pubescent, compressed. *Spikes* usually 5, digitate, one below the rest; spikelets usually 5 flowered. *Glumes* unequal, with the keels scabrous. *Wire grass.*
4 June—Oct. Common. 1–2 ft

3 E Cruciata. *Stem* decumbent and assurgent, glabrous. *Leaves* narrow, ciliate. *Spikes* 2–4; spikelets usually 3-flowered, the terminal one usually sterile, or wanting, extremity of the rachis naked.
☉ July—Common 12–18 inches

CEREALIÆ.

Inflorescence spiked. *Spikelets* 1, or many flowered.—*Glumes* equal. Upper palea 2-keeled.

Genus XXXII ELYMUS.

Spikelets 2, or more at each joint of the rachis, 3–9-flowered. *Glumes* 2, nearly equal, sometimes absent, lower palea entire, with a short awn, upper one bifid. *Scales* ovate, hairy.

1 E Virginicus. *Stem* erect, glabrous. *Leaves* scabrous, with scabrous sheaths. *Glumes* 2, somewhat lateral, terminating by an awn, the exterior palea concave, awned, about the size of the interior.
♃ June—Aug. Dry soils. 2–3 ft.

2 E Striatus. *Spike* erect; spikelets 2-flowered, awned, hispid, in pairs. *Glumes* linear, awned. *Stem* erect, striate. *Leaves* lanceolate, acuminate, upper surface scabrous. *Rachis* pubescent.
♃ June. Shady woods. 8–12 in.

3 E Hystrix. *Spike* erect; spikelets expanding, 4-flowered, destitute of glumes. *Paleae* glabrous. *Leaves* glaucous.
♃ July. Mountains 2–3 feet.

Genus XXXIII ROTTBOLLIA.

Flowers in 1-sided spikes. *Glumes* 1–2-flowered, the flowers sterile and perfect.

1 R Dimidiata. *Stem* creeping, branching, glabrous. *Leaves* glabrous, sometimes opposite, perennial. *Spikes* terminal, flat. *Glumes* unequal, the exterior shortest. *Paleae* lanceolate, the exterior longest.
♃ Through the summer. On the sea coast.

Genus XXXIV SPARTINA.

Flowers in one sided spikes, imbricate, in 2 rows. *Glumes* 2, unequal, keeled. *Paleæ* 2, unequal, without awns.

1 S Juncea. *Stem* glabrous, columnar. *Leaves* linear, convolute when old. *Sheaths* glabrous, ciliate at the throat. *Spikes* few, pedunculate; exterior glume small, the interior one long, keeled; exterior palea shortest, the interior compressed, as long as the glume.
♃ Through the summer. Sea coast. 2–3 ft.

2 S Polystachya. *Stem* glabrous, columnar. *Leaves* broad, very long, scabrous on the upper surface. *Sheath* longer than the joints, with the throat hairy. *Spikes* numerous, 10–12 expanding, alternate.
♃ September. On the sea coast. 3–10 ft.

3 S Glabra. *Stem* glabrous, fistular. *Leaves* long, glabrous, concave *Spikes* erect, appressed 5–8. *Glumes* and pal æ ciliate on the keels.
♃ August—Sept. On the sea coast. 2–4 ft.

SACHARINEÆ.

Inflorescence spiked, or panicled. *Glumes* not keeled. *Paleæ* thin, membranaceous, without keels, the lower one commonly bearded.

Genus XXXV. ANDROPOGON.

Flowers polygamous, spiked. *Spikelets* in pairs, 1–2-flowered, the lower ones sterile, or when but one it is perfect.

Glumes and *paleæ* sometimes wanting, when present, the glumes coriaceous. *Paleæ* membranaceous, with the lower one generally awned.

1 A CILIATUS. *Stem* erect, sometimes decumbent, pubescent at the joints. *Leaves* scabrous, slightly hairy. *Panicle* naked, expanding. *Flowers* perfect and sterile. *Glumes* hairy, the exterior one many nerved, the interior 5-nerved. *Paleæ* ciliate, the interior one awned.
4 September. Pine barrens. 3-4 ft.

2 A NUTANS. *Stem* erect, glabrous, lower joints swollen. *Leaves* scabrous. *Panicle* branching nodding. *Flowers* by pairs. *Glumes* hairy, colored, fringed at the summit. *Paleæ* hairy, the inner one with a contorted awn.
4 Sept.—Oct. Dry soils. Very common. 3–6 ft.

3 A MELANOCARPUS. *Stem* erect, branching, glabrous. *Leaves* scabrous, with the sheath hairy at the throat. *Spikes* clustered, many flowered, with the involucre bearing a long awn. *Glumes* 2, lanceolate, pubescent, colored. *Palea* small, membranous, with a long contorted awn arising from the base.
4 Sept.—Oct. Pine barrens. 2–3 ft.

4 A SCOPARIUS. *Stem* glabrous, tinged with purple. *Leaves* channeled, slightly hairy. *Sheaths* hairy. *Flowers* in straight panicles, by pairs on the spikes, the perfect ones sessile, the neuter one stiped and awned. *Rachis* hairy. *Glumes* 2, the exterior 5-nerved. *Palea* purple, with hairy margins, the interior awned at the summit.
4 Sept.—Oct. Poor soils, common. 2–3 ft.

5 A ARGENTEUS. *Stem* glabrous, branching, tinged with purple. *Leaves* linear, scabrous. *Panicle* long, slender. *Spikes* conjugate, covered with white silvery hairs. *Glumes* hairy along the margins.
4 Sept.—Oct. Dry soils. 2–3 ft.

6 A VAGINATUS. *Stem* erect, glabrous. *Leaves* long, linear, with glabrous sheaths. *Panicle* slender, appressed, branches divided. *Spikes* short, solitary, or conjugate. *Rachis* hairy. *Glumes* serrulate. *Flowers* monandrous.
4 Sept.—Oct. Damp soils. 3 ft.

7 A DISTICHIFLORUM. *Stem* erect, branching. *Leaves* linear, scabrous, with the throat of the sheath hairy. *Panicle* appressed. *Spikes* conjugate. *Flowers* by pairs, hairy, monandrous, with a straight awn. *Broom grass.*
4 Sept.—Oct. Common. 3–4 ft.

8 A MACROURUS. *Stem* erect, slightly compressed. *Leaves* linear, slightly scabrous. *Sheath* villous along the margin. *Panicles* clustered. *Spikes* conjugate, clustered, each having a sheath. *Peduncles* hairy. *Flowers* monandrous with a straight awn.
4 October. Damp soils. 2–3 ft.

9 A TETRASTACHYUS. *Stem* erect, glabrous. *Leaves* long, hairy on the upper surface. *Sheaths* hairy. *Panicle* slender, erect, appressed; sheaths of the spikes long. *Spikes* usually 4. *Glumes* serrulate, with a hairy involucre at the base. *Flowers* monandrous.
4 October. Pine barrens. 2–3 ft.

10 A FURCATUS. *Stem* erect, glabrous. *Leaves* linear, nearly glabrous. *Spikes* generally by fours, terminal; sterile flowers without awns, the awn of the perfect floret contorted.
4 August—Sept. Mountains. 2–3 ft.

GENUS XXXVI. GYMNOPOGON.

Glumes 2, carinate, nearly equal, longer than the floret. *Palea* shorter than the glumes, equal; the exterior one 3-nerved, terminated by a straight awn. *Spike* panicled.

1 G Racemosum. *Stem* erect and decumbent, glabrous, short joints. *Leaves* distichous, cordate, lanceolate, nerved, short, glabrous. *Sheaths* hairy at the throat. *Panicle* terminal, expanding, somewhat verticillate.
4 Sept—Oct. Dry soils. 1–2 ft.

Genus XXXVII. ERIANTHUS.

Glumes 2, nearly equal, villous at the base. *Paleæ* 2, unequal, the inner one bearing a long awn near its summit. *Stamens* 2. *Styles* 2.

1 E Alopecuroides. *Stem* erect, a little scabrous, villous towards the summit. *Leaves* long, striate, hairy on the under surface. *Sheath* villous at the throat. *Flowers* in a crowded villous panicle. *Involucre* hairlike. *Glume* lanceolate. *Paleae* purplish, unequal; the interior smallest, awned.
4 Sept.—Oct. Wet grounds. 6–10 ft.

2 E Brevibarbis. *Stem* erect, upper joints bearded, lanceolate, hairy at the base. *Flowers* in appressed panicles *Glumes* purple, ciliate. *Paleae* ciliate, purplish
4 Sept.—Oct. Common. 3–5 ft.

3 E Strictus. *Stem* erect· *Leaves* long, scabrous on the margins. *Panicle* appressed; spikelets 2-flowered. *Involucre* consisting of a few hairs, or wanting. *Glumes* with the nerves spinous.
4 Aug.—Sept. Low country. 4–6 ft.

4 E Contortus. *Stem* erect, bearded at the jonits. *Leaves* long, linear-lanceolate. *Panicle* appressed. *Involucre* as long as the glumes. Interior palea shortest, with a spirally contorted awn.
4 Sept.—October. Low country. 4–5 ft

ORYZEÆ.

Inflorescence panicled. *Spikelets* solitary, 1-flowered.—The lower palea cartilaginous, compressed, keeled.

Genus XXXVIII LEERSIA.

Spikelets 1-flowered. *Glume* none. *Paleæ* 2, keeled, compressed. *Scales* 2. *Flowers* in panicles.

1 L Virginica. *Stem* decumbent, erect, hairy at the joints. *Leaves* linear-lanceolate, scabrous, acute *Panicle* loose, terminal, with scattered branches. *Flowers* on one side of the rachis, monandrous. *Paleae* equal, the exterior one keeled, the interior one ciliate. *Rice grass.*
4 Aug.—Sept. Damp soils. 2–3 ft.

2 L Lenticularis. *Stem* erect, glabrous, except at the joints. *Leaves* scabrous along the margins. *Sheaths* hispid. *Panicle* erect. *Flowers* large, diandrous. *Paleae* ciliate.
4 Aug.—Sept. Damp soils. 2–4 ft.

3 L Oryzoides. *Stem* erect, or procumbent at the base. *Leaves* scabrous, linear-lanceolate. *Panicle* large. *Flowers* triandrous, imbricate, with the keel of the paleæ ciliate.
4 Oct.—Novomber. Swamps. 3–4 feet.

Genus XXXIX ZIZANIA.

Flowers monœcious. *Glume* none. *Sterile florets* mingled with the fertile ones. *Paleæ* 2, sub-awned. *Fertile florets* paleæ 2, awned. *Style* 2-parted.

1 Z AQUATICA *Stem* erect, glabrous, pubescent at the joints. *Leaves* oblong, lanceolate, glabrous. *Sheaths* shorter than the joints. *Flowers* in terminal panicles, the upper branches bearing fertile flowers, the lower ones sterile. *Stamens* 6. *Styles* 2. *Wild Rice.*
4 Oct.—Nov. In inundated lands. 6–12 ft.

2 Z MILIACEA. *Stem* erect, glabrous. *Leaves* very long, 2–6 feet, 1–2 inches wide, flat. *Flowers* in an expanding panicle, fertile and sterile ones interningled. *Glumes* with short awns.
4 April—May. In water. 6–10 ft.

BAMBUSACEÆ.

GENUS XL ARUNDINARIA

Glumes 2, many flowered, unequal, the exterior one smallest. *Palea* 2, unequal, the exterior one largest. *Styles* 3-cleft, short.

1 A MACROSPERMA. *Stem* erect, glabrous, terete, with hollow internodes. *Leaves* large, flat, distichous; sheaths longer than the joints. *Panicle* terminal, composed of distichous spikes, peduncles pubescent. The exterior glumes ciliate, very small. The exterior palea largest, ciliate. Seed cylindrical. Does not flower every year. When it does bloom, it is in the spring.
4 Rich, damp soils. 5–20 feet. *Cane.*

ORDER CXXIII. CYPERACEÆ.

Flowers perfect, or monœcious, consisting of imbricated, solitary bracts. *Perianth* none, unless the glumes, when present, be so considered. *Stamens* hypogynous, definite, 1–12. *Anthers* fixed by their base. *Ovary* 1-seeded, often surrounded by hypogynous setæ, which are probably a rudimentary perianth. *Style* 1, divided. *Stems* usually angular.—*Sheaths* of the leaves entire.

GENUS I CYPERUS.

Spikelets compressed. *Glumes* imbricate, in 2 rows, each generally enclosing a flower. *Setæ* none.

1 C ARTICULATUS. *Stem* erect, jointed, clothed at the base with 3 sheath like leaves. *Flowers* in compound umbels; spikelets many flowered. *Glumes* dotted with red, two or three of the lowest sterile.
4 June—Aug. Wet places. 3–6 ft.

2 C FASCICULATUS. *Stem* triquetrous. *Leaves* setaceous, 1 or 2. *Spikes* many flowered, in terminal fascicles. *Involucre* 2-leaved, linear. *Glumes* with the keel green.
4 June—Aug. Middle Ga. 6–8 in.

3 C POLYSTACHYUS. *Stem* triquetrous, glabrous. *Leaves* linear, glabrous. *Spikes* fascicled, flattened. *Involucre* 3-leaved, 2 of them long. *Glumes* ovate, yellowish.
4 July—Aug. Sandy fields. 6–8 inches.

4 C FILICULMIS. *Stem* triquetrous. *Flowers* in globose heads.—*Spikes* generally 8-flowered. *Involucre* 4-leaved.
4 June. Wet pine woods. 6–8 in.

5 C Autumnalis. *Stem* terete. *Spikes* slender, terminal, digitate, usually by threes. *Involucre* 2-leaved, as long as the umbel. *Glumes* purple.
♃ July—Aug. On margins of ponds.

6 C Compressus. *Stem* triquetrous, naked. *Leaves* linear-lanceolate.—*Flowers* in compound umbels; spikelets many flowered, nearly capitate. *Glumes* acuminate, with white margins.
♃ Aug.—Sept. Sandy pastures. 3-8 in.

7 C Vegetus. *Stem* slender, nearly terete. *Leaves* linear lanceolate, channeled, finely serrulate near the summit. *Flowers* in compound umbels. *Spikelets* in globose heads. *Involucre* 4-leaved. *Glumes* ovate.
♃ June—Sept. Ponds and ditches. 2-3 ft.

8 C Virens. *Stem* triquetruous. *Leaves* linear-lanceolate, 2-3 feet long. Umbels compound; spikelets in compact heads, many flowered. *Involucre* long. *Flowers* monandrous.
♃ May—Oct. Rich swamps, common.

9 C Mariscoides. *Stem* erect, glabrous, naked. *Leaves* channeled, serrulate. *Spikes* in globose heads, terminal. *Involucre* 3-leaved, long. *Glumes* compressed.
♃ June—Sept. Sandy soils. 1 foot.

10 C Flavescens. *Stem* nearly terete, shining. *Leaves* linear, sheathing the stem at the base. *Umbels* compound; spikelets crowded, lanceolate.
♃ July—Oct. Wet soils. 8-12 in.

11 C Gracilis. *Stem* slender, acutely angled. *Leaves* 3-angled. *Umbels* compound; spikelets linear-lanceolate.
☉ Sept.—Oct. Damp soils. 10-12 in.

12 C Hydra. *Stem* obtusely angled. *Leaves* radicle, recurved. *Umbels* simple and compound; spikelets linear. *Involucre* 2-3-leaved.
♃ Through the summer. Sea coast. 3-8 in.

13 C Repens. *Stem* 3-angled, with the sides concave. *Leaves* glabrous, recurved. *Umbels* usually simple. *Involucre* 3-4-leaved. *Spikes* crowded.
♃ July—Sept. In fields. 12-18 in.

14 C Tenuiflorus. *Stem* leafy, nearly terete. *Leaves* channeled, serrulate. *Spikes* corymbose; spikelets linear. *Involucre* many leaved, with the two exterior very long. *Flowers* frequently diandrous.

15 C Strigosus *Stem* 3-angled. *Leaves* long, minutely serrate. *Spikes* oblong; spikelets subulate. *Involucre* longer than the umbel.
♃ August—Oct. Wet places. 2-3 ft.

16 C Tetragonus. *Stem* naked, angled. *Leaves* channeled, serrulate. *Umbels* many rayed. *Spikes* 3-5 flowered.
♃ 2-3 ft.

17 C Flavicomis. *Stem* obtusely angled. *Leaves* linear-lanceolate, slightly serrulate near the summit. *Umbels* compound. *Involucre* long. *Spikes* expanding, 10-12-flowered.
♃ May—Sept. Rich soils. 1-2 ft

18 C Speciosus. *Stem* erect. angled. *Leaves* channeled serrulate. *Spikes* in corymbs; spikelets subulate, 6-8 flowered, distichous. *Involucre* many leaved, long. *Involucels* longer than the partial umbels; common peduncles sheathed at the base.
♃ August—Oct. Wet places. 2-4 ft.

19 C Enslenii. *Stem* 3-angled. *Leaves* linear, scabrous along the midrib and margins. *Spikes* corymbose, branching at the base; spikelets numerous, linear, crowded, brown. *Involucre* 8-leaved, exterior one longest.
♃ August—Sept. In wet places. 1-2 ft.

Genus II DULICHIUM.

Spikes somewhat racemose, axillary. *Spikelets* linear-lan-

ceolate, compressed. *Glumes* distichous, sheathing. *Style* very long, 2 cleft. *Nut* with bristles at the base.

1 D Spathaceum. *Stem* striate, columnar, terete at the base, triangular above. *Leaves* linear-lanceolate, pointing in 3 directions; spikelets spreading, 6–7 flowered, forming axillary racemes. *Peduncles* as long as the sheaths of the leaves.

Genus III. KYLLINGIA.

Flowers distinct, arranged in a roundish spike, imbricate *Glumes* 2, 1-flowered. *Palæ* 2, longer than the glumes.

1 K Monocephala. *Stem* filiform, 3-angled. *Leaves* linear, heads single, inclining to one side. *Involucre* generally 3-leaved, one of the leaves erect.
♃ October. Lower Ga. 2–12 in.

2 K Pumila. *Stem* erect, triquetrous, glabrous. *Leaves* subulate, expanding. *Involucre* usually 3-leaved, unequal. *Flowers* in a terminal, nearly globose head. *Glumes* none. *Palæ* 2, compressed. *Flowers* diandrous.
♃ August—Dec. Damp soils. Very common. 3–6 in.

3 K Maculata. *Stem* triquetrous, glabrous. *Leaves* subulate. *Flowers* usually in 3 heads. *Glume* 1, lanceolate, cuneate. *Palæ* 2, unequal, the exterior one shortest. *Flowers* monandrous.
♃ August—Oct. 3–5 in.

SCIRPEÆ.

Genus IV. SCIRPUS.

Glumes imbricating the spike on all sides, one or two of the outer ones occasionally without flowers. *Palæ* none. *Seed* 1, with bristles at its base.

(*a*) *Spike solitary, terminal.*

8 S Capillaceus. *Stem* erect, and procumbent, slightly furrowed with a sheath surrounding its base. *Leaves* none. *Glumes* acute. *Seed* compressed, obovate, with 6 bristles at the base.
☺ March—June. 1–3 in.

2 S Trichodes. *Stem* setaceous, glabrous. *Spikes* ovate-lanceolate. *Glumes* ovate-lanceolate, nearly white. *Seed* 3-angled, ribbed
☺ June—July. Low country. 6–8 in.

3 S Simplex. *Stem* erect, glabrous, with a sheath at the base. *Spike* ovate. *Glumes* obtuse, nearly white.
♃ Through the summer. Wet places. 8–13 in.

4 S Filiformis. *Stem* filiform, terete. *Spike* cylindrical, oblong, obtuse. *Glumes* nearly round.
July—Aug. Wet places.

5 S Palustris. *Stem* glabrous, striate, lucid, with 2–3 sheaths at the base. *Spike* oblong-lanceolate. *Glume* obtuse, with the midrib green.
♃ April—May. Marshes. 1–2 ft.

6 S Capitatus. *Stem* erect, glabrous, inflated, with a short sheath at the base. *Spike* ovate. *Glumes* coriaceous, nearly round. *Bristles* 6.
♃ Through the summer. Damp soils. 10–18 in.

7 S Tuberculatus. *Stem* erect, columnar, sheathed at the base. *Spike* ovate-lanceolate. *Glumes* obtuse, with scarious margins. *Stamens* 2. *Seed* striate, with a sagitate tuburcle. *Bristles* plumose.
♃ July—Aug. Wet soils. 10–12 in.

8 S Quadrangulatus. *Stem* quadrangular, glabrous, with the sides unc-

qual, sheathed at the base. *Spike* cylindrical. *Glumes* nearly orbicular, with ferruginous margins. *Bristles* 3, setaceous.

♃ April—May. In swamps. 1-2 ft.

9 S EQUISETOIDES. *Stem* erect, terete, glabrous, jointed, sheathed at the base. *Spikes* cylindrical. *Glumes* obtuse, tinged with purple.

♃ June—July. Damp soils. 18-24 in.

(*b*) *Spikes numerous. Stems without leaves.*

10 S DEBILIS. *Stem* erect, triangular, glabrous, sheathed at the base.—*Spikes* 3, ovate. *Involucre* long, erect. *Glumes* mucronate, ovate, membranous.

♃ Aug.—Sept. Upper dis. Car. & Ga. 12-18 in.

11 S AMERICANUS. *Stem* erect, triangular, glabrous, sheathed at the base. *Spikes* 6-8, ovate, sessile. *Glumes* ferruginous, ovate. *Bristles* pilose.

♃ Through the summer. Very common. 2-3 ft.

12 S LACUSTRIS. *Stem* erect, stout, glabrous, striate. *Spikes* numerous, forming an umbel. *Involucre* 2-leaved, unequal. *Glumes* lanceolate, ciliate. *Bristles* 6, retrorsely aculeate.

(*c*) *Spikes numerous. Stem leafy at the base.*

13 S AUTUMNALIS *Stem* erect, compressed. *Leaves* linear, flat. *Sheath* bearded at the throat. *Spikes* lanceolate, in compound umbels. *Glumes* lanceolate.

☺ Aug.—Oct. Damp soils, very common. 8-12 in.

14 S CILIATIFOLIUS. *Stem* slender, striate. *Leaves* linear, channeled, ciliate. *Spikes* ovate, in compound umbels, with a short involucre. *Glumes* lanceolate.

☺ Sept.—Oct. Damp soils, 6-8 in.

15 S STENOPHYLLUS. *Stem* filiform, obtusely 3-angled, erect and procumbent. *Leaves* setaceous, with the throat of the sheath hairy. *Spikes* clustered, sessile. *Involucre* 4-leaved, with the leaves unequal. *Flowers* monandrous.

☺ July—Sept. Dry soils. 3-4 in.

16 S COARCTATUS. *Stem* filiform, generally declining. *Leaves* glabrous, with the throat of the sheath bearded. *Spikes* in a compound umbel. *Involucre* many leaved, setaceous, one of the leaves longer than the rest. *Glumes* ferruginous, ciliate.

☺ Sept.—Oct. Dry soils. 10-12 in.

17 S CASTANEUS. *Stem* erect, striate. *Leaves* narrow, erect, rigid. *Spikes* ovate, in a terminal compound umbel. *Involucre* 2-leaved. *Glumes* nearly round.

☺ June—July. Low country.

18 S SPADICEUS. *Stems* forming a thick tuft. *Leaves* long, narrow, arranged in two rows. *Spikes* in compound umbels, with the sessile one in the division of the stem. *Involucre* subulate. *Glumes* nearly orbicular, glabrous.

June—Oct. On the sea coast. 2-3 ft.

19 S FERRUGINEUS. *Stem* erect, compressed, with the angles at the summit scabrous. *Leaves* coriaceous, with cartilaginous margins. Throat of the sheath ciliate. *Spikes* in compound umbels, with the sessile one in the division of the stem. *Involucre* ciliate. *Glumes* coriaceous, ferruginous, pubescent and ciliate.

♃ June—Oct. In moist places. 1-3 ft.

20 S SULCATUS. *Stem* erect, glabrous, terete. *Leaves* glabrous serrulate. *Spikes* ovate-lanceolate, in compound umbels. *Involucre* subulate. small. *Glumes* membranaceous.

Aug.—Sept. Damp soils. 12-15 in.

(*d*) *Spikes numerous. Stems leafy.*

21 S MARITIMUS. *Stem* erect, 3-angled. *Leaves* very long, glabrous, chan-

neled. *Spikes* arranged in a leafy panicle, some sessile, others pedunculate, large and ovate. *Glumes* mucronate, toothed at the summit, with the midrib extending into an awn.

4 May—June. In salt water marshes. 3–4 ft.

22 S Exaltatus. *Stem* obtusely 3-angled. *Leaves* long, glabrous, finely serrulate. *Spikes* ovate, clustered, in a compound umbel. *Involure* many leaved, longer than the umbel. *Involucel* short.

Var. Viviparus. *Stem* tall, somewhat climbing. *Umbels* viviparous, bearing flowers at the base of the branches.

4 July—Aug. In shady woods. 2–10 ft.

23 S Lineatus. *Stem* triangular, leafy, glabrous. *Leaves* lanceolate, channeled, finely serrulate. *Spikes* ovate, in axillary umbels. *Glumes* ferruginous, with the midrib green.

4 June—Aug. Pine barrens. 2–3 ft.

24 S Divaricatus. *Stem* erect, obtusely 3-angled, glabrous. *Leaves* flat, with finely serrulate margins, glabrous. *Spikes* oval, pendulous, in compound umbels. *Glumes* ovate, margins white, midrib green.

4 May—June. Pine barrens. 2–4 ft.

25 S Schœnoides. *Stem* triangular, glabrous. *Leaves* linear, short.—*Spikes* ovate-lanceolate, clustered, numerous, arranged in a compound panicle. *Glumes* ovate, ferruginous.

4 July—Aug. In low country. 2–3 ft.

Genus V ERIOPHORUM.

Glumes chaffy, imbricate in all directions. *Paleæ* none. *Seed* surrounded by a long, dense wool.

1 E Virginicum. *Stem* erect, glabrous, terete. *Leaves* linear, keeled, with the margins scabrous. *Spikes* clustered, in a globose head. *Involucre* longer than the head, 3-leaved, unequal. *Flowers* diandrous.

4 Aug.—Sept. In wet places. 3–4 ft.

Genus VI SCHŒNUS.

Glumes numerous, collected into a spike, lower ones empty. *Paleæ* none, deciduous. *Seed* naked.

1 S Effusus. *Stem* erect, stout, leafy, obtusely 3-angled. *Leaves* long, glabrous, finely serrate. *Flowers* in compound panicles, lateral or terminal, diffuse. *Seed* ovate, wrinkled, without bristles or hairs.

4 August—Sept. In ponds. 6–10 ft.

Genus VII. DICHROMENA.

Glumes imbricate on all sides, the lower ones without flowers. *Paleæ* none. *Seed* naked.

1 D Leucocephala. *Stem* erect triangular, naked. *Leaves* linear, glabrous, concave. *Flowers* in compound heads. *Involucre* 6-leaved, white at the base, the three exterior ones longest. *Glumes* membranaceous, lanceolate, white.

4 July—Oct. Damp soils. 10–12 in.

2 D Latifolia. *Stem* erect, glabrous, leafy at the base, terete. *Leaves* usually longer than the stem, concave, with long sheaths. *Flowers* in compressed heads, compound. *Involucre* about 10-leaved, the exterior ones longest tapering towards the summit, white. *Glumes* ovate, white.

4 May—June. On the margins of ponds. 10–18 in.

Genus VIII. RHYNCOSPORA.

Glumes collected into a spike, inferior ones without flowers. *Paleæ* none. *Seed* 1, crowned with a persistent style, surrounded by bristles.

1 R Alba. *Stem* slender, glabrous, 3-angled at the summit. *Leaves* linear, channeled, glabrous. *Spikes* in corymbose clusters, axillary and terminal. *Glumes* nearly white. *Seed* tuberculate, surrounded by 10 bristles.
☉ May—June. Common. 10–12 in.

2 R Rariflora. *Stem* leafy setaceous. *Leaves* glabrous setaceous. *Flowers* in lateral and terminal panicles. *Glumes* 5–7, the exterior ones smallest, the two interior resembling paleæ. *Bristles* 3–4.
♃ April—May. In bogs, common. 10–12 in.

3 R Plumosa. *Stem* erect, glabrous, 3-angled, slender. *Leaves* linear, with scabrous margins. *Flowers* terminal crowded. *Glumes* ovate, awned. *Seed* rugose, with 6 plumose bristles.
♃ June—Aug. Pine barrens. 8–12 in.

4 R Cymosa. *Stem* terete, erect. *Leaves* linear, glabrous, concave. *Flowers* in axillary and terminal panicles. *Glumes* usually 6, with the outer ones ferruginous, the inner one white, 2-flowered. *Seed* compressed, oval. *Bristles* 6.
♃ Through the summer. Bogs and ditches. 1–3 ft.

5 R Longirostris. *Stem* triangular, erect, glabrous. *Leaves* linear-lanceolate, channeled, glabrous. *Flowers* in corymbose panicles, axillary and terminal. *Glumes* usually 6, with the flowers between the fifth and sixth glumes. *Seed* compressed, terminated by a long persistent style.
♃ July—Oct. Wet places. 3–6 ft.

6 R Distans. *Stem* triangular. *Leaves* glabrous, serrulate, linear. *Flowers* in axillary clusters. *Spikes* sessile, the clusters pedunculate.
♃ June—Sept. Damp soils. 1–2 ft.

7 R Punctata. *Stem* triangular, slender. *Leaves* linear-lanceolate, with scabrous margins. *Flowers* in lateral and terminal fascicles, clustered at the summit. *Glumes* mucronate. *Seed* compressed.
♃ July—Aug. Damp places. 1–2 ft.

8 R Capitellata. *Stem* erect, triangular. *Flowers* in spherical, axillary heads. *Leaves* setaceous, shorter than the stem. *Seed* compressed, surrounded by scabrous bristles.
♃ May—Sept. Wet places. 1–2 ft.

9 R Inexpansa. *Stem* somewhat triangular, generally inclined. *Leaves* linear, channeled. *Flowers* in axillary and terminal panicles, pendulous. *Seed* compressed, surrounded by scabrous bristles.
♃ Through the summer. Wet soils. 1--2 ft.

10 R Caduca. *Stem* triangular, erect. *Leaves* linear-lanceolate, glabrous, serrulate. *Flowers* in axillary panicles; spikelets sessile. *Seed* rough, surrounded by bristles.
♃ July—August. Damp soils. 1–2 ft.

11 R Sparsa. *Stem* triangular, erect. *Leaves* linear-lanceolate, glabrous, serrulate. *Flowers* in diffuse axillary panicles. *Seed* rough, surrounded by bristles.
♃ Wet soils. May Aug. 1–2 ft.

Genus IX. FUIRENA.

Glumes arranged in a spike, on all sides, awned. *Paleæ* 3, petaloid, awned, cordate, unguiculate.

1 F Squarrosa. *Stem* erect, hairy at the summit. *Leaves* lanceolate, 3-nerved, ciliate. *Flowers* in ovate heads, clustered. *Glumes* oval, with long awns, expanding. *Paleæ* cordate, or rounded at the base.
♃ August—Sept. Bogs. 1-2 ft.

2 F Scirpoidea. *Stem* erect, slender, terete, smooth, sheathed *Flowers* in a terminal ovate head. *Glumes* pubescent with a short awn. *Paleæ* oval, or lanceolate, sometimes unawnd.
♃ July—Aug. Damp soils. 12–15 in.

C. SCLEREÆ.

Genus X SCLERIA.

Flowers monœcious. *Sterile Florets; glumes* 2–6, many flowered. *Paleæ* unawned. *Fertile Florets; glumes* 2–6, 1-flowered. *Paleæ* none. *Stigmas* 1–3. *Seed* subglobose.

1 S Oligantha. *Stem* slender, 3-angled, glabrous, slightly pubescent at the summit. *Leaves* linear, slightly pubescent at the base, scabrous, on the upper surface. *Flowers* in fascicles or spikes, 2–3-sessile near the summit, one on a long peduncle. Fertile florets at the summit; sterile at the base. *Seed* white, smooth.
♃ May—June. Pine barrens. 12–18 in.

2 S Gracilis. *Stem* filiform, 3-angled, glabrous. *Leaves* linear, glabrous, narrow. *Spikes* 2–3 at the summit of the stem, each bearing a fertile floret. *Glumes* ferruginous, mucronate. *Seed* white, smooth.
♃ May—June. Southern Ga. 10–12 in.

3 S Triglomerata. *Stem* triangular, striate, scabrous. *Leaves* linear-lanceolate, somewhat hairy. *Flowers* in terminal and lateral spikes, clustered, pendulous. *Glumes* ciliate, mucronate. *Fertile* florets 2–3 in each spike. *Seed* smooth.
♃ Through the Summer. In dry or moist soils, common. 1–2 ft.

4 S Pauciflora. *Stem* slender, acutely 3-angled, glabrous. *Leaves* linear, scabrous along the margin. *Spikes* lateral and terminal, pendulous. *Glumes* keeled, ferruginous, glabrous. *Seed* rough.
♃ May—Sept. Damp soils. 12–18 in.

5 S Ciliata. *Stem* erect, glabrous, generally 1-leaved. *Leaf* pubescent on the upper surface, linear, channeled. *Spikes* in terminal clusters. *Glumes* ciliate, ovate, ferruginous. *Seed* rough.
♃ May—June. Damp soils. 1–2 ft.

6 S Hirtella. *Stem* erect, triangular, pubescent. *Leaves* narrow, pubescent channeled. *Spikes* axillary or terminal. *Bracts* hairy, ciliate. *Glumes* pubescent, unequal. *Seed* wrinkled.
♃ Through the Summer. Damp soils. 12–18 in.

7 S Reticulata. *Stem* acutely 3-angled, glabrous. *Leaves* narrow, glabrous, with the sheaths winged. *Spikes* numerous, axillary and terminal, on long peduncles. *Glumes* lanceolate, glabrous. *Seed* rough.
♃ July—August. Damp soils. 1–2 ft.

8 S Verticillata. *Stem* slender, glabrous, 3-angled. *Leaves* glabrous, filiform. *Flowers* in clustered spikes. *Glumes* ovate, acuminate. *Seed* globose, mucronate, transversely wrinkled.
♃ July—Aug. Damp soils. 10–15 in.

9 S Interrupta. *Stem* erect 3-angled, pubescent. *Leaves* pubescent. *Spikes* clustered, alternate. *Glumes* bristly. *Seed* globose, mucronate, transversely wrinkled.
♃ July—Aug. Damp soils. 12–15 in.

D. CARICINÆ.

Genus II CAREX.

Flowers monœcious, rarely diœcious. *Flowers* imbricate, amentaceous. *Glume* 1, 1-flowered. *Palcæ* of the sterile florets none, of the fertile ones ventricose, persistent, enclosing the nut.

A. Inflorescence diœcious.

1 C Sterilis. *Stem* obtusely angled, slightly scabrous. *Leaves* linear, sheathing. *Spikes* 3-6. *Fruit* ovate-acuminate, 3-angled, compressed, apex recurved bicuspidate.

♃ May. Marshes. 8-12 in.

B. Inflorescence monœcious.

(a) Spikes androgynous, solitary, with the summit sterile.

2 C Fraseri. *Stem* erect. *Leaves* broad, lanceolate, radicle, undulate, crenulate. *Spike* simple, ovate. *Fruit* entire at the apex, longer than the glume.

♃ April. Mountains.

3 C Willdenowii. *Stem* triangular, erect. Leaves linear, longer than the stem. *Spike* terminal, simple, ovate; sterile and fertile flowers about equal in number, about 6. *Fruit* ovate, nearly terete, beaked. *Glumes* ovate, the inferior ones long and foliaceous, acuminate.

♃ May—June. Dry woods. 6-8 in.

(b) Spike solitary with the summit fertile.

4 C Squarrosa. *Stem* triangular, scabrous along the margin. *Leaves* narrow, glabrous, with scabrous margins. *Spikes* mostly simple, sometimes 2-3 cylindrical, oblong, very thick. *Glumes* at the base lanceolate, slightly colored, those of the summit. *Fruit* imbricate, smooth, bi-dentate, longer than the glume.

♃ May—June. Bogs. 1-2 ft.

(c) Spikes several, collected into a head.

5 C Cephalophora. *Stem* 3-angled, scabrous along the margins, leafy at the base. *Leaves* linear, Long. *Spikes* collected into an elliptical head. *Glumes* ovate, mucronate. *Fruit* ovate, scabrous on the margin.

♃ May—June. Oak woods, common. 2-3 ft.

(d) Spikes distinct, not in a head, the summit sterile, stigmas 2.

6 C Bromoides. *Stem* 3-angled, scabrous along the margins, slender. *Leaves* linear, slightly scabrous. *Flowers* in numerous linear spikes, the spikes alternate, erect. *Glumes* lanceolate, mucronate. *Palea* ovate. *Fruit* scabrous, bifid, longer, than the glume.

♃ April. Damp soils. 12-18 in.

7 C Retrofulva. *Stem* slightly angled, slender. *Leaves* nearly filiform, scabrous along the margin. *Spikes* 4-6. *Glumes* ovate, shorter than the paleæ. *Fruit* ovate-lanceolate, bi-dentate, as long as the glumes.

♃ May. Dry soils. 10-12 in.

8 C Rosea. *Stem* slender, slightly angled. *Leaves* linear. *Spikes* 4-6, remote, the lowest one with a setaceous bract. *Fruit* ovate, 2-toothed, ciliate. *Glumes* ovate, nearly as long as the paleæ.

♃ May. Damp woods. 10-12 in.

9 C Muhlenbergii. *Stem* erect, angular, stout, scabrous at the summit. *Leaves* linear, sheathing the stem. *Spikes* about 5, ovate, crowded at the summit of the stem. *Bractial* leaves setaceous, longer than the spikes. *Glumes* mucronate, longer than the paleæ. *Palea* 2-cleft at the summit.

♃ May. Shady woods. 1-2 ft.

10 C Stipata. *Stem* erect, smooth, succular. *Leaves* channeled, ligulate. *Spikes* numerous, compound, bracteate, with the bracts longer than the spikelets. *Glumes* membranaceous. *Palcæ* ovate, serrulate. *Fruit* lanceolate, bi-dentate.

4 April—May. Wet lands. 1-3 ft.

11 C Sparganoides. *Stem* erect, nearly terete. *Leaves* numerous, striate. *Flowers* in 6-8 sessile spikes, numerous. *Bracts* longer than the spikes. *Glumes* mucronate. *Palcæ* expanding, serrate. *Fruit* ovate, compressed, bifid, double the length of the glume.

4 April—May. Damp soils. 1-2 ft.

12 C. Multiflora. *Stem* scabrous, 3-angled. *Leaves* narrow, rigid, longer than the stem. *Spike* compound, oblong, spikelets glomerate, ovate, oblong, obtuse. *Glumes* lanceolate, brownish. *Fruit* ovate, acuminate, compressed, 2-nerved, serrulate on the margin, diverging when mature, shorter than the glumes.

4 May. Moist lands. 12-18 in.

(e) Spikes numerous, the upper florets fertile. Stigmas 2.

13 C Lagopodioides. *Stem* erect, obtusely 3-angled, scabrous towards the summit. *Leaves* sheathing the stem at the base, ligulate. *Spikes* numerous, elliptic crowded. *Bract* beneath the lowest, very long, overtopping the stem. *Fruit* bi-cuspidate, erect, lanceolate, with a serrulate margin, longer than the glume.

4 May. Wet lands. 1-2 ft.

14 C Scoparia. *Stem* obtusely angled. *Leaves* linear, with scabrous margins towards the summit. *Spikes* 5-8, alternate, elliptic, lowest one bracteate. *Glumes* ovate, membranaceous. *Fruit* ovate-lanceolate, margined, smooth, bi-cuspidate, longer than the glumes, nerved.

4 May. Swamps. 1-2 ft.

15 C Fœna. *Stem* obtusely 3-angled, scabrous near the summit, furrowed. *Spikes* numerous, the lower ones compound, the upper ones aggregated. *Palcæ* serrulate, larger than the ciliate glumes, the lowest bract largest, subulate

4 May—June. Marshes. 1-2 ft.

16 C Festucacea. *Stem* erect, slender, sometimes decumbent. *Leaves* narrow. *Flowers* in linear spikes, 5-8, approximate. *Bracts* small. *Glumes* lanceolate, membranaceous. *Fruit* beaked, winged, serrulate along the margins, white or green.

4 May. Damp soils. 2-3 ft.

17 C Scirpoides. *Stem* erect, slender, slightly 3-angled. *Leaves* narrow, the lower ones short. *Spikes* 4-6, ovate, the uppermost one clavate. *Glume* small. *Palcæ* ovate, 2-toothed. *Fruit* ovate, bi dentate, longer than the glume.

4 May. Swamps. 6-12 in.

(f) Sterile and fertile spikes distinct. Sterile spikes solitary.

18 C Cæspitosa. *Stem* erect, slender, 3-angled, striate. *Leaves* linear, acute, with scabrous margins, fertile spikes cylindrical, generally 3, nearly sessile, sometimes with sterile florets at the summit. *Bracts* long. *Fruit* ovate, obtuse, longer than the glume.

4 May. In bogs. 12-18 in

19 C Crinita. *Stem* acutely angled, concave, serrulate. *Leaves* channeled, glabrous. *Fertile* spikes 3-4, pendulous, each generally terminated by a number of sterile florets. *Glumes* ovate, with a subulate point. *Palcæ* ovate, not divided at the summit, shorter than the glume. *Fruit* elliptic, with a short beak, shorter than the glume.

4 April—May. Swamps. 1-2 ft.

20 C Acuta. *Stem* 3 angled, scabrous. *Leaves* narrow, with scabrous margins, the upper ones sessile, the lower sheathing. Sterile spikes 1-3; fertile 3-4, nodding, cylindrical, the upper ones sessile, with sterile florets at the summit. *Glumes* acute. *Palcæ* ovate, entire. *Fruit* oblong.

4 April—May. In bogs. 1-2 ft.

(g) *Stigmas* 3, *terminal spike sterile, the rest androgynous.*

21 C TRICEPS. *Stem* acutely angled, slender, scabrous along the margins. *Leaves* linear, pubescent at the base. *Spikes* usually 4, approximate, sessile, 3 of them larger than the other. *Glumes* ovate. *Paleæ* shorter than the glume, glabrous. *Fruit* ovate, compressed, 3-angled.

♃ April—May. Damp soils. 12–18 in.

22 C HIRSUTA. *Stem* 3-angled, slender, pubescent near the summit. *Leaves* narrow, slightly pubescent- *Spikes* 3–4, the terminal one sterile at the base. lower ones on short peduncles. *Fruit* ovate, obtuse.

♃ May—June. Southern Ga. 10–12 in.

23 C BUXBAUMII. *Stem* slender, 3-angled. *Leaves* narrow, with scabrous margins. *Spikes* 3–4, the terminal one, with the lower half, bearing sterile flowers. *Glumes* lanceolate, dark colored. *Paleæ* light colored, 2-cleft at the summit. *Fruit* eliptic, as long as the glume.

♃ July—Aug. Swamps. 1–2 ft.

24 C TRICHOCARPA. *Stem* acutely 3-angled, the angles serrulate. *Leaves* channeled, rather broad, scabrous on the upper surface. Sterile spikes 1–5, terete; fertile 2–3, erect, cylindrical. *Bracts* of the fertile spikes like the leaves, long. *Glumes* slightly mucronate. *Paleæ* ovate, pubescent. *Fruit* hairy, ovate, longer than the glumes.

♃ April. Swamps. Low country. 2–3 ft.

(*h*) *Stigmas* 3; *fertile and sterile spikes distinct, the fertile ones sessile, or with sheathed peduncles.*

25 C VARIA. *Stem* erect, slender, with scabrous angles. *Leaves* subulate. Fertile spikes generally 3, nearly globose; sterile spike terminal. *Glumes* oblong-lanceolate, tinged with brown. *Paleæ* pubescent. *Fruit* sub-globose, hispidly pubescent, obtusely 3-angled.

♃ April—May. Dry woods. 8–12 in.

26 C MARGINATA. *Stem* slender, 3-angled. *Leaves* linear, with slightly scabrous margins; fertile spikes generally 2, sub-globose, approximate, the sterile one terminal, cylindrical, long. *Glumes* ovate, brown, with a white margin. *Fruit* globose, pubescent, longer than the glume.

♃ April—May. Dry soils. 8–12 in.

27 C VESTITA. *Stem* acutely 3-angled. *Leaves* narrow, ligulate. Sterile spike mostly solitary, terminal; fertile spikes generally 2, sessile, sometimes sterile at the summit. *Glumes* brown, with white margins. *Paleæ* pubescent, *Fruit* ovate, nerved, pubescent, with a short beak.

♃ May—June. Wet soils. 1–2 ft.

28 C TENTACULATA. *Stem* 3-angled. *Leaves* long, linear-lanceolate, nerved. Sterile spike solitary, cylindrical; fertile spikes 3, sessile, horizontal, with long bracts. *Glumes* mucronate. *Paleæ* ovate, beaked. *Fruit* ovate, nerved, with a long beak.

♃ May—June. Wet places- 12–18 in.

29 C LUPULINA. *Stem* erect, glabrous, leafy, thick, 3-angled. *Leaves* linear-lanceolate, with scabrous margins. Sterile spike on a short peduncle; fertile ones, 3, erect, with long, leafy bracts. *Glume* with a hispid point.— *Paleæ* 2-beaked, longer than the glume. *Fruit* ovate, nerved, with 2 long beaks.

♃ April—May. Swamps. 2–3 ft.

30 C GIGANTEA. *Stem* erect, 3-angled, glabrous. *Leaves* ligulate, slightly channeled. Sterile spike terminal, with acute, ovate glumes; fertile spikes 3. *Paleæ* ovate, nerved. *Fruit* 3-angled.

♃ April—May. Bogs, common. 1–2 ft.

31 C FOLLICULATA. *Stem* erect, 3 angled. *Leaves* ligulate, scabrous. Sterile spike solitary, terminal, with acute, lanceolate, glumes; fertile spikes usually 4, erect, on short peduncles. *Paleæ* ovate, beaked, inflated. *Fruit* ovate, beaked.

♃ June. Swamps. 12–18 in.

32 C Xanthophysa. *Stem* erect, slender, leafy. Fertile spikes 3–4, ovate, remote, pedunculate. *Fruit* striate, bifid, horizontal when mature, tapering into a long acute point. *Glumes* ovate, acuminate.
♃ June. Swamps. 2–4 ft.

(i) Stigmas 3. *Fertile spikes on peduncles.*

33 C Plantaginea. *Stem* erect, glabrous, with purple sheaths, nearly leafless. *Leaves* linear, nerved, glabrous. Sterile spike terminal; fertile ones mostly 4, distant, erect, linear, the lower ones on long peduncles. *Bracts* leafy, sheathing the peduncle. *Fruit* oblong, cuneiform, recurved at the apex.
♃ April—May. Shaded soils. 8–12 in.

34 C Castanea. *Stem* 3-angled, slender, purple at the base. *Leaves* linear, shorter than the stem. Sterile spikes shorter than the bract. *Glumes* brown, with white margins. Fertile spikes 3, nearly round, the lowest one on a long peduncle. *Palea* inflated, with a long beak, shining. *Fruit* 3-angled.
♃ April. Wet pine barrens. 1–2 ft.

35 C Anceps. *Stem* 3-angled, compressed. *Leaves* broad. Fertile spikes 3, loosely flowered, cylindric. *Bracts* sheathing. *Fruit* ovate, 3-angled, acute, narrowed at the base about as long as the glume.
♃ April—May. Woods, 12–15 in.

36 C Conoidea. *Stem* 3-angled, the angles scabrous. *Leaves* narrow, flat, scabrous along the margin. Fertile spikes 2–3 remote, the lower ones, on long peduncles. Sterile spike terminal, small, with lanceolate glumes, the lower bracts leaflike. *Fruit* conical, obtuse, recurved at the apex.
♃ April. Wet soils. About 1 ft.

37 C Tetanica. *Stem* slender, glabrous, 3-angled. *Leaves* linear, shorter than the stem. Fertile spikes 2, distant, the upper one nearly sessile, the lower on a long peduncle, the sterile spike on a long peduncle. *Glume* mucronate. *Fruit* ovate-oblong, acute at each end, oblique.
♃ May. Wet soils. 12 in.

38 C Laxiflora. *Stem* 3-angled, with scabrous margins. *Leaves* narrow-lanceolate, acute, nerved. Sterile spike nearly sessile; fertile spikes 2–3, the lowest one on a long peduncle, the upper one, shorter. *Glume* ovate, cuspidate. *Fruit* ovate-oblong, longer than the glume, shining, inflated.
♃ May. Woods. 12–18 in.

39 C Granularis. *Stem* erect, or decumbent, glaucous. *Leaves* narrow, somewhat glaucous. Sterile spike usually solitary; fertile spikes 2–3, the lowest pedunculate, the upper nearly sessile. *Glumes* ovate, acuminate. *Palea* nearly orbicular. *Fruit* nerved, with a short, recurved beak.
♃ May. Wet shaded soils. 12 in.

40 C Flexuosa. *Stem* slender, 3-angled, glabrous. *Leaves* linear, slightly channeled. Sterile spike slender, terminal; fertile spikes 4, pendulous, remote, the peduncles sheathed. *Glumes* lanceolate. *Palea* striate. *Fruit* oblong, beaked, double the length of the glume.
♃ April—May. Damp soils. 12 in.

(j) Fertile spikes on long peduncles, nearly destitute of sheaths.

41 C Miliacea. *Stem* slender, 3-angled, with the angles scabrous. *Leaves* linear, with scabrous margins. Fertile spikes 3, slender, filiform, nodding. *Bracts* of the lower spike longer than the stem, those of the upper small. *Glumes* emarginate. *Fruit* ovate, 3 angled, with short beak, longer than the glume.
♃ May. Wet grounds. 12–15 in.

42 C Hystericina. *Stem* 5-angled, with the angles scabrous. *Leaves* narrow, long, scabrous. Sterile spikes cylindrical, with ovate-lanceolate glumes; fertile spikes 3–4, thick, the lower ones on exserted peduncles. *Palea* ovate, with a long 2-cleft beak. *Glume* ovate, terminated by a hispid setaceous bristle. *Bracts* long. *Fruit* ovate, nerved, beaked.
♃ April—May. Wet soils. 1–2 ft.

43 C Pseudo-Cyperus. *Stem* erect, acutely 3-angled, scabrous along the

angles, stout. *Leaves* channeled, with scabrous margins. Sterile spike long, slender, with linear-lanceolate glumes; fertile spikes, 3 pendulous. *Bracts* long, scabrous, serrated. *Palæ* ovate, beaked, 2-cleft at the summit. *Glume* small, with a subulate point. *Fruit* oblong-lanceolate, beaked, many nerved, with the apex bifid.

♃ June. In swamps. 2 ft.

44 C Glaucescens. *Stem* 3, angled, glabrous. *Leaves* narrow-channeled, serrulate, the lower ones glaucous. Sterile spike solitary, pedunculate, with ferruginous, ovate glumes; fertile spikes 3-4, cylindrical, on short peduncles, becoming pendulous. *Scales* ovate, emarginate, mucronate. *Palæ* ovate, glaucous. *Fruit* 3-angled.

♃ April—May. Around ponds. 1-2 ft.

(k) Sterile spikes numerous. Stigmas 2

45 C Crinita. *Stem* erect. *Leaves* long, pale green. Sterile spikes, germinate, scarcely any; androgynous; fertile ones 4, distant, pendulous. *Fruit* roundish, ovate, slightly beaked. *Glume* linear, longer than the fruit.

♃ June. Swamps. 2-4 ft.

46 C Acuta. *Stem* scarcely 3-angled. *Leaves* somewhat glaucous. Sterile spikes 1-3; fertile ones usually 3, nodding, remote, cylindrical. *Glumes* oblong, acute, brown. *Fruit* oblong, as long as the glume.

♃ May. Wet soils. 2 ft.

(l) Sterile florets 2, or more. Stigmas 3.

47 C Trichocarpa. *Stem* erect. Sterile spikes 2-4, pedunculate; fertile florets 3, pedunculate, erect, cylindric. *Fruit* ovate-lanceolate, acuminate, pubescent. *Glumes* ovate, acuminate, shorter than the fruit.

♃ May. Swamps. 2-3 ft.

48 C Lacustris. *Stem* erect, 3-angled. *Leaves* broad, long. Sterile spikes usually 4; fertile ones usually 3, erect, on short peduncles. *Glumes* ovate, mucronate. *Fruit* oblong, smooth, many nerved, longer than the glumes, brown.

♃ June. Swamps. 3-5 ft.

49 C Filifera. *Stem* erect, 3-angled. *Leaves* long, linear. Sterile spikes 2-4, the upper ones pedunculate; fertile ones 2-3, the upper ones sessile, the lowest on erect peduncles. *Glumes* lanceolate, mucronate. *Fruit* ovate, 2-cleft, hairy, shorter than the scale.

♃ April—May. Damp woods. 1-2 ft.

50 C Riparia. *Stem* erect, smooth, 3 angled. *Leaves* ligulate, the upper ones without sheaths. Sterile spikes usually 4. *Glumes* chaffy. Fertile spikes 3, erect, with sterile flowers at the summit. *Fruit* ovate, 2-cleft, nerved, shorter than the glume

♃ March—April. Marshes. 1-2 ft.

51 C Bullata. *Stem* slender, acutely 3 angled. *Leaves* narrow, with scabrous margins. Sterile spikes, 3, slender; fertile spikes 2, erect, on short pedancles. *Glumes* lanceolate, acute. *Palæ* ovate, with pubescent nerves. *Fruit* ovate, beaked, 3-angled

♃ April. In ditches. 2 ft.

Sub-Class III. APETALÆ, or MONOCHLAMYDEÆ.

[This Sub-Class should have come in immediately preceding the Order *Coniferæ* under Dicotyledonous plants, but through mistake some of the Monocotyledonous plants were printed off before the omission was discovered. This notice will prevent any misapprehension on the part of the student, from its present position.]

Flowers with a simple perianth.

Order CXXIV. NYCTAGINEÆ.

Perianth tubular, somewhat colored, æstivation plaited, becoming indurated at the base. *Stamens* definite, hypogynous. *Ovary* superior; ovule 1. erect. *Style* 1. *Fruit* enclosed in the tube of the calyx. *Seed* with its testa coherent with the utricle. *Cotyledons* foliaceous. *Leaves* opposite, usually unequal.

Genus I BŒRHAAVIA.

Perianth campanulate, plaited. *Stamens* 2, or more, attached to the base of the perianth. *Style* 1. *Stigma* capitate. *Seed* 1.

1 B Erecta. *Stem* erect, trichotomous, glabrous at the summit, jointed. *Leaves* opposite, ovate, undulate, veins purple on the under surface. *Flowers* in corymbose panicles. *Perianth* seated on a minute, glandular ring, white, tinged with purple. *Stamens* 2–3, longer than the perianth.
☉ June—Sept. Sandy soils.

Genus II ALLIONIA.

Involucre oblong, simple, 3-flowered. *Perianth* longer than the involucre, irregular. *Stamens* 4. *Style* 1.

1 A Albida *Stem* erect, quadrangular, furrowed, sprinkled with a glandular pubescence. *Leaves* opposite, oblong-lanceolate, irregular, often slightly panduriform, scabrous along the margins. *Involucre* 5-cleft, hairy. *Seed* naked, angled, almost hispid.
☉ April—May. Mid. Car. & Ga.

Order CXXV. AMARANTHACEÆ.

Perianth 2–5-leaved, hypogynous, persistent. *Stamens* 3–5. *Styles* 3. *Ovary* superior, 1-celled, 1-seeded. *Seeds* pendulous. *Embryo* curved. Herbaceous plants, with simple leaves. *Flowers* monœcious.

Genus I AMARANTHUS.

Genus same as the Order.

1 A Hybridus. *Stem* erect. *Leaves* ovate-lanceolate. *Flowers* in compound racemes, crowded, pentandrous. *Perianth* consisting of subulate leaves.

☺ June—Sept. About cultivated grounds. 2–3 ft.

Order CXXVI. CHENOPODEÆ.

Perianth deeply divided, persistent, sometimes tubular at the base. *Stamens* 1 or 5, inserted into the base of the perianth, opposite its segments. *Ovary* single, superior, sometimes adhering to the calyx. *Ovule* 1. *Styles* divided, rarely simple. *Fruit* membraneous, sometimes baccate. *Seed* erect. *Embryo* curved. Herbaceous plants. *Flowers* small, sometimes polygamous.

Genus I CHENOPODIUM.

Flowers perfect. *Perianth* 5-cleft, 5-angled, enclosing the fruit. *Stamens* 5. *Styles* 2.

1 B Murale. *Stem* decumbent, branching. *Leaves* ovate, lanceolate, toothed, on long petioles. *Flowers* in leafy, corymbose racemes.

☺ Aug.—Sept. Cultivated lands. 12–18 in.

2 C Album. *Stem* branching. *Leaves* ovate, rhomboid erose, entire at the base, the upper ones entire, when old becoming covered with a mealy substance. *Flowers* in branched racemes, somewhat leafy. *Seed* smooth.

☺ July—Aug. Waste grounds. 3–6 ft.

3 C Botrys. *Stem* much branched, somewhat viscid. *Leaves* oblong, sinuately pinnatifid, with the segments toothed. *Flowers* in short, axillary racemes at the extremity of the branches. *Jerusalem Oak.*

☺ July—Aug. Common. 1–3 ft.

4 C Ambrosioides. *Stem* much branched, somewhat pubescent. *Leaves* lanceolate, remotely toothed, on short petioles. *Flowers* in erect spikes, leafy.

☺ Aug.—Sept. Road sides. 1–2 ft.

5 C Anthelminticum. *Stem* erect, branching, furrowed. *Leaves* oblong-lanceolate, sinuately toothed, rugose, dotted on the under surface. *Flowers* in axillary, terminal and leafless spikes. *Worm seed.*

♃ June—Aug. Fields. 4–6 ft.

Genus II SALSOLA.

Perianth 5-leaved. *Stamens* 5. *Styles* 2, or none. *Stigmas* acute. *Capsule* 1-seeded. *Seed* spiral.

1 S Caroliniana. *Stem* erect, striate, glabrous, branching. *Leaves* subulate, fleshy, rigid. *Flowers* usually solitary, sessile, with 2 bracts at the base. *Calyx* persistent, red.

☺ June—Sept. In drifting lands.

2 S Linearis. *Stem* erect, furrowed, glabrous, branching. *Leaves* linear, alternate. *Flowers* sessile, axillary, crowded. *Calyx* fleshy. *Style* none. *Stigmas* 2. *Fruit* clothed by the calyx, spiral.

☺ Sept.—Oct. On the sea coast.

Genus III ATRIPLEX.

Flowers polygamous, or monœcious. Perfect flowers peri-

anth 5-parted. *Stamens* 5. *Style* 2-parted. *Fruit* depressed, 1-seeded, enclosed by the calyx. Pistillate florets perianth 2-parted. *Stamens* none. *Style* 2-parted.

1 A PATULA. *Stem* prostrate, spreading, somewhat angled, glabrous. *Leaves* triangular, hastate, acuminate, entire, or slightly toothed, glabrous. *Flowers* clustered, in axillary and terminal spikes. *Calyx* persistent, submuricate on the sides.
☉ June—Sept. In low country. 1-2 ft.

2 A ANGUSTIFOLIA. *Stem* divaricate, angled, glabrous. Lower leaves hastate, slightly toothed, the upper ones lanceolate, entire, attenuate at the base. *Flowers* in axillary and terminal compact clusters. *Calyx* hastate.
☉ June—July. On the sea coast.

3 A LACINIATA. *Stem* diffuse, terete, pubescent towards the summit. *Leaves* triangular, deeply toothed, pubescent beneath; lower ones opposite. *Flowers* in axillary clusters. *Stamens* 4. *Calyx* rhomboidal acute, entire.
☉ June—Aug. Salt marshes.

4 A ARENARIA. *Stem* geniculate, glabrous, much branched. *Leaves* oblong-ovate, mucronate, alternate, covered with white scales beneath, entire. *Perianth* muricate, dentate. *Flowers* monœcious. Sterile ones at the extremity of the branches. Fertile ones in axillary clusters.
☉ July—Nov. On the sea coast. 10–12 in.

GENUS IV ACNIDA.

Flowers diœcious. Sterile florets perianth 5-parted. *Stamens* 5. Fertile florets, perianth 3-parted. *Stigmas* 3–5, sessile. *Capsule* 1-seeded.

1 A CANNABINA. *Stem* erect, glabrous, slightly. *Leaves* alternate, ribbed, ovate-lanceolate, usually colored, 2-5 inches long. *Flowers* in large, axillary and terminal panicles. The sterile plant smaller than the fertile. *Stigmas* nearly plumose. *Seed* ovate, compressed, glabrous. *Water hemp.*
☉ Oct.—Nov. Marshes. 4–8 feet.

GENUS V SALICORNIA.

Perianth ventricose, fleshy, closed. *Stamens* 1–2. *Style* 1, bifid. *Fruit* enclosed in the perianth. *Seed* 1.

1 S HERBACEA. *Stem* erect, much branched, jointed, succulent; joints notched, compressed. *Flowers* by threes, in cylindrical spikes, slightly tapering at the extremity. *Perianth* thick, truncate, split on one side.
☉ Aug.—Sept. Salt marshes. 10–12 in. *Samphire.*

2 S AMBIGUA. *Stem* procumbent, branching, assurgent; joints crescent shaped, small. *Flowers* in opposite and alternate spikes. *Calyx* truncate.
♃ July—Sept. Salt marshes, very common.

ORDER CXXVII. PHYTOLACCEÆ.

Perianth 5-parted, petaloid. *Stamens* 10, alternate with the segments of the perianth. *Ovary* 10-celled, with one ovule in each cell. *Styles* 5–10. *Fruit* indehiscent. *Seed* ascending, solitary. Herbaceous plants, with alternate leaves.

Genus 1. PHYTOLACCA.

Genus the same as the Order.

1 P Decandra. *Stem* succulent, tinged with purple. *Leaves* ovate, alternate, entire. *Flowers* in simple racemes opposite the leaves. *Fruit* superior, 10 celled, 10-seeded, dark purple. *Pukeberry.*

♃ May—Sept. Cultivated grounds, very common. 4-10 ft.

Order CXXVIII. POLYGONEÆ.

Perianth divided, inferior, æstivation imbricate. *Stamens* definite, 5-9 inserted into the bottom of the perianth. *Ovary* superior, with a single erect ovule. *Styles* or stigmas several. *Fruit* usually a triangular nut. *Seed* with farinaceous albumen. *Embryo* inverted. Herbaceous plants, with alternate leaves, sheathing at the base.

Genus 1. POLYGONUM.

Perianth 5-parted, petaloid, persistent. *Stamens* 5-9. *Styles* usually 3. *Fruit* 1-seeded, mostly triangular.

(*a*) *Flowers axillary. Stamens* 8. *Stigmas* 3.

1 P Maritimum. *Stem* glabrous, branching. *Leaves* lanceolate, attenuate at the base, with revolute margins. *Stipules* large, frequently lacerate. *Flowers* axillary. *Perianth* white, tinged with red.

♃ May—Sept. On the sea coast. 1-2 ft.

2 P Aviculare. *Stem* procumbent, striate, glabrous, much branched. *Leaves* alternate, elliptic lanceolate, varying in size and shape, margins scabrous. *Stipules* membranaceous. *Flowers* axillary, few. *Perianth* persistent, greenish white. *Knot grass.*

♃ June—Oct. Common.

3 P Tenue. *Stem* slender, erect, branching, acutely angled. *Leaves* linear, acuminate, straight. *Stipules* lacerate, villous at the summit. *Flowers* usually solitary, alternate, small, on short pedicels. *Perianth* white. *Nut* triangular, shining, black.

☺ Jul.—Sept. On rocks. 6-10 in

(*b*) *Flowers in axillary or terminal spikes. Stamens* 5-8. *Stigmas mostly* 2.

4 P Punctatum. *Stem* slender, branched, sometimes decumbent at the base. *Leaves* pellucid punctures, lanceolate, acute, with a sheathing petiole, scabrous on the margin and midrib. *Stipules* ciliate pubescent. *Flowers* in filiform spikes. *Stamens* 8. *Styles* 3-parted. *Plant* very acrid. *Water pepper.*

☺ August—Sept. Wet ground. 1-2 ft.

5 P Mite. *Stem* decumbent and erect, hairy at the summit, branching. *Leaves* narrow-lanceolate, acuminate entire, hairy, with long ciliæ. *Flowers* in crowded spikes. *Stamens* 8. *Styles* 3 parted. *Perianth* purple.

☺ July—Sept. Ditches and ponds. 1-2 ft.

6 P Virginianum. *Stem* simple, hairy towards the summit. *Leaves* broad-lanceolate, acuminate, scabrous, with fringed serratures. *Stipules* ciliate. *Spikes* axillary and terminal. *Stamens* 5 *Styles* 2. *Perianth* white.

♃ July—Aug. Shady woods. 2-4 ft.

7 P Setaceum. *Stem* erect, glabrous. *Leaves* broad-lanceolate, acuminate. *Stipules* long, fringed. *Flowers* in bursate spikes, on long peduncles. *Stamens* 8. *Style* 3-cleft. *Perianth* white.

♃ June—Aug. Stiff soils. 1-2 ft.

8 P HIRSUTUM. *Stem* erect, decumbent, branching, hairy. *Leaves* oblong, often slightly cordate at the base, hairy, entire. *Flowers* in slender spikes. *Stamens* 8. *Style* 3 cleft. *Perianth* white.

♃ May—Aug. Shallow ponds. 1–2 ft.

9 P INCARNATUM. *Stem* geniculate, slightly angled, scabrous towards the summit. *Leaves* lanceolate, serrulate, pubescent on the upper surface, large. *Flowers* in several simple spikes. *Stamens* 6. *Style* 2-cleft. *Perianth* white, or rose colored.

♃ July—Oct. Ditches and ponds. 2–3 ft.

10 P PENNSYLVANICUM. *Stem* geniculate, with swollen joints, glabrous, angled. *Leaves* lanceolate, slightly hairy, petioled. *Flowers* in crowded oblong spikes, large. *Stamens* 8. *Style* 2-cleft. *Peduncles* hispid. *Perianth* reddish.

☺ July—Sept. Margins of ponds. 2–4 ft.

11 P ORIENTALE. *Stem* erect. *Leaves* large, ovate, acuminate, minutely pubescent, petioled. *Stipules* hairy. *Flowers* in crowded spikes, large. *Stamens* 6. *Styles* 2. *Perianth* rose color, or white.

☺ July—Aug. Cultivated grounds. 4–5 ft.

(c) Spikes in panicles.

12 P POLYGAMUM. *Stem* erect, branching, glabrous. *Leaves* small, sessile, with glabrous stipules. *Spikes* paniculate, jointed. *Flowers* solitary at each joint. *Stamens* 8 *Styles* 3. *Perianth* white.

♃ July—Sept. Pine barrens. Middle Car. & Ga. 6–8 in.

(d) Flowers in racemose panicles. Leaves subcordate or sagittate.

13 P SAGITTATUM. *Stem* slender, climbing, angled, retrorsely serrate. *Leaves* nearly sessile, glabrous, sagittate. *Flowers* axillary and terminal, in small compact heads, on long peduncles. *Stamens* 8. *Styles* 3-cleft. *Perianth* white.

☺ July—Aug. Wet grounds.

14 P ARIFOLIUM. *Stem* retrorsely aculeate, prostrate, flexuous, sometimes climbing, square, pubescent. *Leaves* hastate, on long petioles, pubescent. *Spikes* few flowered, terminal and axillary. *Stamens* 6. *Styles* bifid.

☺ August—Sept. Wet grounds.

15 P CONVOLVULUS *Stem* long, climbing, angular, somewhat rough.—*Leaves* petioled, hastate-cordate, with spreading lobes. *Flowers* in axillary racemes. *Stamens* 8. *Style* 3 cleft. *Perianth* whitish, or reddish.

☺ July—Aug. Field.

16 P SCANDENS. *Stem* climbing, glabrous, bright purple, angled. *Leaves* broad-cordate, with the margins and veins slightly scabrous. *Flowers* in axillary racemes, large. *Stamens* 8. *Styles* 3. *Perianth* winged, white, or reddish.

☺ July—Aug. Shady woods.

GENUS II RUMEX.

Perianth 6-leaved, in 2 rows. *Stamens* 6. *Styles* 3. *Nut* triquetrous, enclosed by the three interior valves of the perianth. *Stigmas* many cleft.

1 R SANGUINEUS. *Stem* erect. Radicle leaves large, entire, cordate-lanceolate, variegated with red veins. *Flowers* in small, distant whorls. *Perianth* persistent, marked on the back with red grains.

♃ June—July. Fields. 3 ft. *Bloody dock.*

2 R PULCHER. Radicle leaves oblong, with a sinus on each side. Cauline leaves entire. *Perianth* toothed.

♃ June—July. Introduced.

3 R VERTICILLATUS. *Leaves* long, lanceolate, narrow, acute, with cylin-

drical sheaths. *Flowers* whorled, in simple racemes. Leaves of the perianth entire, each bearing a vein on the back. *Pedicels* thick, half an inch long.
4 June—July. Wet grounds. 1-2 ft.

4 R Britannicus. *Stem* branching, tinged with red, furrowed. *Leaves* broad lanceolate, flat, alternate. *Flowers* in leafless whorls, forming a compound, terminal panicle, polygamous.
4 April—May. Swamps. 2-3 ft.

5 R Crispus. *Stem* erect, angled. Radicle leaves lanceolate, long, acute, undulate, attenuate at the base. *Flowers* in crowded whorls, pedicillate.—Leaves of the perianth large, cordate, entire, bearing grains.
4 May—June. Introduced. 1-2 ft.

6 R Persicarioides. *Stem* erect, much branched, smooth, often colored. *Leaves* on short petioles, lanceolate, undulate, entire. *Flowers* in whorls.—Leaves of the perianth with 3 long teeth on each side, each leaf bearing a grain.
4 July. Wet, shady places. 6-12 in.

7 R Divaricatus. *Stem* erect. *Leaves* cordate, oblong, pubescent, undulate. *Flowers* in whorls, forming a long, slender spike. Leaves of the perianth 4 or 5-toothed at the base.
4 June—Aug. Marshes. 1-2 ft.

8 R Acetosella. *Flowers* diœcious. *Stem* erect, furrowed. *Leaves* lanceolate, entire, hastate, on rather long petioles, not auricled. *Flowers* in fasciculate racemes.
4 April—June. Dry sandy soils, very common. 1-2 ft.

9 R Hastatulus. *Flowers* diœcious. *Stem* erect. *Leaves* petiolate, oblong, hastate, with obtuse entire auricles. *Perianth* persistent, becoming red by age.
4 April. Poor dry soils. 1-3 ft.

Genus III. ERIOGONUM.

Involucre campanulate, many flowered. *Perianth* 6-cleft. *Stamens* 9. *Style* 1. *Stigmas* 3. *Seed* 1, 3-angled.

1 E Tomentosum. *Stem* erect, branching, somewhat dichotomous. *Leaves* oval-lanceolate, 3 at each division of the stem, sessile, white, tomentose beneath. Lower leaves attenuate at the base. *Flowers* in axillary sessile clusters.
4 June—Sept. Sand hills. 1-2 ft.

Order CXXIX. LAURINEÆ.

Flowers perfect, polygamous and diœcious. *Perianth* 4–6-cleft. *Stamens* perigynous, usually 9, the three inner ones sterile. *Anthers* adnate, 2–4-celled, with thick connectivum. *Ovary* superior, single. *Style* simple, obtuse. *Fruit* a one-seeded drupe. *Shrubs* or small trees, with alternate leaves.

Genus I. LAURUS.

Genus the same as the Order.

1 L Carolinensis. A large shrub, or small tree. *Leaves* oval-lanceolate, coriaceous, perennial, glaucous beneath, entire, rigid. *Flowers* in small clusters, polygamous, pale yellow, exterior segments of the perianth half as the interior. *Bay galls.*
ħ May—June. Swamps. 4–30 ft.

2 L Catesbeyana. A middle sized shrub. *Leaves* perennial, broad-lanceolate, glabrous. *Flowers* in panicles, on short peduncles; segments of the perianth oblong, obtuse, deciduous, white. *Nectary* 3-cleft. *Berry* ovate, black.
ħ May—June. On the sea coast. 6–9 ft.

3 L Benzoin. A shrub with virgate branches. *Leaves* ob-ovate, lanceolate, deciduous, pubescent beneath, cuneate at the base. *Flowers* dioecious, in clustered umbels, on short pedicels, pale yellow. *Fruit* red. *Spice wood.*
Feb.—March. Margins of rivulets. 4–10 ft.

4 L Geniculata. A small tree, much branched, with the branches regularly bent. *Leaves* small, oval, glabrous, obtuse. *Flowers* deciduous, dioecious, in umbels, yellow. *Fruit* red,
ħ Feb.—March. Around ponds. 10–15 ft.

5 L Melissæfolia. A small shrub. *Leaves* cordate, lanceolate, pubescent beneath, deciduous. *Flowers* in clustered umbels, dioecious, yellow. *Fruit* red.
ħ Feb.—March. Around ponds. 2–3 ft.

6 L Sassafras. A small tree. *Leaves* entire and lobed, lanceolate, ovate, varying in form, glabrous or pubescent, deciduous. *Flowers* dioecious, in umbels. *Stamens* of the sterile flowers 9; stamens of the fertile flowers 6, imperfect. *Fruit* blue.
ħ March. Light soils. 10–25 ft.

Order CXXX. THYMELEÆ.

Perianth inferior, tubular, colored, campanulate, with the limb obsolete. *Stamens* 8, perigynous, inserted into the perianth, unequal. *Style* 1. *Stigma* simple. *Fruit* a drupe, 1-seeded. Shrubs with a tough bark. *Leaves* alternate, entire.

Genus I. DIRCA.

Genus the same as the Order.

1 D Palustris. A small shrub, with numerous tough branches. *Leaves* alternate, oblong-oval, entire, obtuse, pale green. *Flowers* yellow, the bark has a sweetish taste, and very tough. *Leather wood.*
ħ April. Damp moist places. 2–4 ft.

Order CXXXI. SANTALACEÆ.

Perianth superior, 4 or 5-cleft, partly colored. *Æstivation* valvate. *Stamens* 4 or 5, opposite the segments of the perianth and inserted into their bases. *Ovary* 1-celled, with 1–4 ovules. *Style* 1. *Stigma* often lobed. *Fruit* a nut or drupe, 1-seeded. Trees or shrubs with alternate, undivided leaves.

Genus I. NYSSA.

Dioecious. Sterile florets; *perianth* 5-parted. *Stamens* 5–10, fertile florets, calyx 5-parted. *Stamens* 2. *Style* 1. *Drupe* inferior.

1 N Multiflora. A middle sized tree. *Leaves* oval-lanceolate, entire.

acute at each end, with the petiole and under surface pubescent. *Flowers* in small umbellate clusters. Sterile florets numerous, fertile florets 5–8 in an umbel. *Drupe* nearly spherical, bluish black. *Black gum.*

♄ April. Damp soils. 40–50 ft.

2 N Aquatica. A small, or large tree. *Leaves* oblong lanceolate, entire, glabrous, acute at each end, slightly pubescent beneath. Sterile florets numerous, small; fertile florets 2. *Fruit* oval, compressed, blue.

3 N Capitata. A small tree. *Leaves* on short petioles, oblong-lanceolate and oval, pubescent and hoary beneath. Sterile florets numerous, in compact heads; fertile florets solitary, on short peduncles. *Perianth* tomentose. *Fruit* ovate, of a dull red color, sour.

♄ April—May. Wet soils. 15–20 ft.

4 N Tomentosa. A tree. *Leaves* on long petioles, oblong acuminate, tomentose beneath, coarsely and acutely toothed. Fertile florets solitary, pedunculate; segments of the perianth cuneate.

♄ April—May. Southern Ga.

5 N Uniflora. A large tree. *Leaves* on long petioles, large, ovate, oblong, acuminate, irregularly and acutely toothed, pubescent beneath; the old leaves cordate. Fertile flowers solitary, axillary. *Fruit* oval, or ovate, dark blue, large.

♄ April—May. Deep swamps. 60–80 ft.

Genus II. HAMILTONIA.

Polygamous. Perfect flowers. *Perianth* turbinate, campanulate, 5-cleft. *Germ* immersed in a 5-toothed, glandular disk. *Stamens* 5. *Style* 1. *Stigmas* 2–3. *Drupe* inferior, 1-seeded, inclosed in the base of the perianth.

1 H Olefiera. A shrub. *Leaves* oblong, obovate, entire, acuminate, pubescent beneath, petiolate. *Flowers* in a terminal raceme, small, greenish yellow. *Nut* globular, depressed, 1-celled. The whole plant more or less oily. *Oil nut.*

♄ May—June. Mountains. 4–6 ft.

Genus III. THESIUM.

Flowers perfect. *Perianth* 4 or 5-cleft. *Stamens* 4 or 5, opposite the lobes of the perianth, villous externally. *Nut* 1-seeded, crowned by the persistent perianth.

1 T Umbellatum. *Stem* erect, glabrous, branching near the summit. *Leaves* oblong, lanceolate, entire, alternate, mucronate. *Flowers* in terminal panicles, sub-corymbed. *Involucre* 4-leaved, small. *Perianth* 5-cleft, with the upper half colored.

♃ July—Aug. Rocky hills. 8–12 in.

Order CXXXII. ARISTOLOCHIÆ.

Flowers perfect. *Perianth* superior, tubular, 3-cleft, regular, or sometimes very unequal, æstivation valvate. *Stamens* 6–12, epigynous. *Ovary* inferior, 3–6-celled. *Ovules* numerous. *Styles* simple. *Stigmas* radiating, equal in number to the cells of the ovary. *Fruit* capsular, 6-celled, many seeded. Herbaceous or shrubby plants, the latter usually

climbing. *Leaves* alternate, simple. *Flowers* axillary, solitary, of a brownish dull color.

Genus I ARISTOLOCHIA.

Flowers gynandrous. *Perianth* tubular, ligulate at the apex, ventricose at the base. *Anthers* 6, sub-sessile, inserted into the style. *Stigma* 6-cleft. *Capsule* 6-sided, 6-celled, many seeded.

1 A Sipho. A vine, climbing over large trees. *Leaves* very large, cordate, acute, alternate, sprinkled with hairs. *Flowers* solitary, pedunculate, with an ovate bract at the base. *Perianth* ascending, somewhat tubular, the border 3-cleft, brown. *Dutchman's pipe.*
♄ June. Mountains.

2 A Tomentosa. *Stem* twining, ascending the loftiest trees. *Leaves* nearly round, cordate, tomentose beneath, strongly veined. *Perianth* villous, the border 3-cleft, nearly equal, the orifice oblique, greenish yellow, with the margin dark purple. *Stigmas* 3.
♄ June. Mountains.

3 A Serpentaria. *Stem* herbaceous, pubescent, erect, geniculate and flexuous, geniculate at the base. *Leaves* cordate, oblong, acuminate, slightly hairy. *Flowers* on radicle peduncles, sometimes under the surface of the ground. Limb of the perianth lanceolate, ventricose at the base.
♄ Through the summer. Dry soils. 8–12 in.

4 A Hastata. *Stem* flexuous, simple, erect and procumbent. *Leaves* somewhat cordate, hastate, acute, auriculate. Peduncles radicle, lip of the perianth ovate.
Mountains.

Genus II ASARUM.

Perianth campanulate, urceolate, 3- 4-cleft. *Stamens* 12, placed upon the ovary. *Anthers* attached to the side of the filament. *Style* short. *Stigma* stellate, 6-lobed. *Capsule* 6-celled.

1 A Canadense. *Leaves* by pairs, broad, reniform. *Perianth* woolly, deeply 3-parted, segments sub-lanceolate, reflexed. *Peduncles* short.
♃ April. Rich soils. *Wild ginger.*

2 A Virginicum. *Leaves* solitary, cordate, nearly round, coriaceous, glabrous, spotted. *Perianth* glabrous, externally short, campanulate, with obtuse segments.
♃ April. Rocky woods.

3 A Arifolium. *Leaves* several from each root, hastate, cordate, variegated, on long, pubescent petioles. *Perianth* urceolate, dark purple, border 3-cleft, pubescent within. *Filaments* 12, short. *Anthers* linear. *Seed* few in each cell.
♃ March—April. Loose soils, very common.

Order CXXXIII. EMPETREÆ.

Flowers diœcious. *Perianth* consisting of 2–4 rows of imbricated hypogynous scales. *Stamens* equal in number to the scales, and alternate with them. *Anthers* with 2 distinct

cells. *Ovary* superior, seated in a fleshy disk, 6–9 celled. *Style* 1. *Stigma* multifid, radiating. *Fruit* baccate, 2-celled, 2-seeded. An evergreen shrub, with flowers in the axils of the leaves.

Genus I. CERATIOLA.

Genus the same as the Order.

1 C Ericoides. An evergreen shrub, with virgate branches, somewhat verticillate when young, tomentose. *Leaves* linear, glabrous, rigid, with the margins revolute, verticillate, 3–4 in a whorl. *Flowers* axillary, sessile. *Scales* of the calyx persistent, tomentose. *Berries* small, 2-seeded.
♄ August—Sept. Dry soils. 4–8 ft.

Order CXXXIV. EUPHORBIACEÆ.

Flowers monœcious, or dicœcious. *Perianth* lobed, inferior, frequently with glandular or scaly apendages. Sterile flowers. *Stamens* 1–12 or numerous. Fertile flowers. *Ovary* 1, superior, sessile or stiped, usually 3-celled. *Ovules* solitary, or twin, suspended. *Styles* usually 3, sometimes united. *Fruit* usually consisting of three dehiscent cells, separating from the axis. *Seed* suspended. Herbaceous, or shrubby plants, usually with milky juice.

Genus I. PACHYSANDRA.

Perianth 4-leaved. *Stamens* 4. *Filaments* sub-clavate. *Styles* 3. *Capsule* 3-horned, 3-celled, cells 2-seeded.

1 P Procumbens. *Stem* procumbent, and simple. *Leaves* alternate, pubescent, crenate, toothed oval. *Flowers* in spikes, nearly radicle, the lower ones fertile, the upper sterile, all bracteate. *Perianth* minute, ciliate. *Capsule* finely pubescent.
♃ June Mountains.

Genus II. CROTON.

Monœcious. Sterile florets. *Perianth* cylindrical, 5-toothed. *Corolla* 4-petaled, or none. *Stamens* 10–15. Fertile flowers. *Perianth* 5 or many leaved, or none. *Corolla* none. *Styles* 3–6, 2-cleft. *Capsule* 3-celled, with one seed in each cell.

1 C Maritimum. *Stem* somewhat shrubby, erect, trichotomously divided, with the branches clothed with a stellular tomentum. *Leaves* oval, obtuse, entire, subcordate, pale above, hoary beneath. *Flowers* in spikes, those of the sterile florets many flowered, the fertile florets generally in pairs. *Capsule* tomentose.
♃ June—Oct. Drifting sands along the sea coast. 2–3 ft.

2 C Argyranthemum. *Stem* somewhat shrubby. *Leaves* entire, obtuse, obovate. *Leaves* entire, obtuse, obovate. *Flowers* numerous in short terminal racemes. *Perianth* pedicillate, silvery.
♃ July. Dry soils. 1–2 ft.

3 C GLANDULOSUM. *Stem* erect, hispid, trichotomously divided, often colored. *Leaves* oblong, serrate, hairy beneath, bearing 2 glands at the base. *Flowers* in spikes in the divisions of the stem, with the fertile and sterile intermingled, the sterile with a 5 petalled corolla, the petals white, longer than the calyx, and inserted into its base. *Stamens* 10, the fertile florets; perianth 5-leaved, hispid. *Leaves* unequal.

☉ June—Oct. Cultivated lands, very common. 1–2 ft.

4 C ELLIPTICUM. *Stem* pubescent, irregularly branched, tomentose when young. *Leaves* oval-lanceolate, entire, pale beneath, stellular, pubescent. *Flowers* in terminal clusters; the sterile spike growing in the midst of the fertile flowers. *Capsule* tomentose.

☉ July. Middle Car. and Ga. 1–2 ft.

GENUS III. CROTONOPSIS.

Monœcious. Sterile florets. *Perianth* 5-parted, with 5, petaloid scales. *Stamens* 5. Fertile florets. *Perianth* 5-parted. *Stigmas* 3, twice bifid. *Capsule* 1-seeded, indehiscent.

1 C LINEARIS. *Stem* erect, dichotomously branched, covered with silvery scales. *Leaves* linear-lanceolate, entire, on short petioles, stellately pubescent above, and with silvery scales beneath. *Flowers* in terminal and axillary spikes, very minute.

☉ May—June. Pine barrens. 12–18 in.

GENUS IV. BORYA.

Dioœcious. Sterile florets. *Perianth* 4-leaved. *Stamens* 2–3. Fertile florets. *Perianth* 4-leaved, unequal. *Stigma* capitate. *Fruit* 1-seeded.

1 B PORCULOSA. Somewhat shrubby, rarely spiny. *Leaves* coriaceous, opposite, oblong-lanceolate, sessile, dotted underneath, and ferruginous, margins revolute.

GENUS V. TRAGIA.

Monœcious. Sterile florets. *Perianth* 3-parted. *Stamens* 3. Fertile florets. *Perianth* 5-parted. *Style* 3-cleft. *Capsule* 3-celled, 3-seeded. *Seed* solitary.

1 T LINEARIFOLIA. *Stem* erect, pubescent, almost tomentose. *Leaves* alternate, linear pubescent, usually entire. *Flowers* in axillary spikes. *Capsule* hirsute.

♃ July—Aug. Southern Ga. 12–18 in.

2 T URENS. *Stem* erect, branching, villous. *Leaves* alternate, lanceolate, toothed towards the summit, hoary beneath. *Flowers* usually in small terminal spikes. *Anthers* united by pairs. *Perianth* of the fertile floret 6-parted.

♃ May—Aug. Dry soils common. 10–15 in.

3 T URTICIFOLIA. *Stem* erect, hirsute, usually simple. *Leaves* cordate-ovate, serrate, hirsute. *Spikes* opposite the leaves. Fertile flowers at the base of each spike. *Capsules* hirsute.

♃ May—Aug. Dry soils, common. 12–18 in.

GENUS VI. STILLINGIA.

Monœcious. *Involucre* hemispherical, many flowered.

Perianth tubular, erose. *Stamens* 2–3 exserted. Fertile florets; perianth 1-flowered, fimbriate or toothed. *Style* trifid. *Capsule* 3-celled, 3-seeded.

1 S Sylvatica. *Stem* herbaceous, somewhat angled, glabrous, with a milky sap. *Leaves* sessile, oblong-lanceolate, serrulate, sub-coriaceous lucid on the upper surface, *Flowers* in a terminal spike, the upper ones sterile, with a few fertile ones at the base.
♃ May—June. Sandy soils. 2–3 ft.

2 S Sebifera. A small tree with glabrous branches, yielding a milky juice or sap. *Leaves* alternate, petiolate, rhomboidal, acuminate, entire, with a gland on the petiole. *Flowers* in terminal spikes with the fertile ones few at the base of the spikes. *Involucre* 10–12 flowered. *Perianth* 4-toothed. *Styles* 3-subulate. *Capsule* black. *Seed* white.
♄ June—July. Introduced. 20–40 ft.

3 S Ligustrina. A shrub much branched, glabrous. *Leaves* lanceolate, tapering, entire, petiolate. *Flowers* in terminal spikes. Sterile florets numerous at the summit; fertile ones few at the base. *Involucre* 1–2 flowered. *Perianth* 3-cleft.
♄ May—July. Margins of creeks. 6–12 ft.

Genus VII. PHYLLANTHUS.

Monœcious. Sterile florets; perianth 5–6-parted. *Filaments* 6-united. Fertile florets; perianth 5–6 parted. *Paracorolla* a 12-angled margin. *Styles* 3. *Capsule* 3-celled, 3-seeded.

1 P Caroliniensis. *Stem* erect, with alternate branches, glabrous. *Leaves* alternate, oval, obtuse, smooth, distichous. *Flowers* axillary, nodding, fertile and sterile intermingled. *Perianth* colored at the base.
☺ Sept.—Oct. Damp soils. 10–12 in.

Genus VIII. JATROPHA.

Monœcious. Sterile florets; perianth funnel-shaped, petaloid. *Stamens* 10, alternately short. Fertile florets; perianth 5-leaved, expanding. *Styles* 3, 2-cleft. *Capsule* 3-celled, 3-seeded.

1 J Stimulosa. *Stem* herbaceous, hispid, stinging. *Leaves* palmately lobed, lobes 3–5-toothed, slightly sinuate, ciliate. *Flowers* with terminal cymes. Fertile florets setting in the divisions of the peduncles. Sterile florets; perianth salverform, pubescent, with a fine cleft border, petaloid, white. *Stamens* 10. Fertile florets; perianth 5-leaved. *Style* 12-cleft.
♃ Through the summer. Sandy soils. 6–18 in.

Genus IX. ACALYPHA.

Monœcious. Sterile florets; perianth 3–4-parted. *Stamens* 8–16, united. Fertile florets; styles 3, 2-parted. *Capsule* 3-celled, 3-seeded.

1 A. Virginica. *Stem* erect, pubescent, striate, branching. *Leaves* alternate, lanceolate, on short petioles, remotely and obtusely serrate, dotted. *Involucre* axillary, pubescent, cordate, toothed. Sterile florets in a spike.

Perianth 4-leaved, hairy. Fertile florets within the involucre. *Perianth* 3-leaved.

☉ June—Sept. In woods and cultivated lands, common. 12–18 in.

2 A Caroliniana. *Stem* erect, pubescent, striate. *Leaves* rhombic-ovate, acuminate, serrate, entire at the base, on long petioles. *Involucre* small, sessile, deeply notched. *Spikes* axillary small, with the fertile flowers at the base.

☉ July—Aug. Cultivated lands. 10–20 in.

Genus X. EUPHORBIA.

Monœcious. *Involucre* campanulate, 8–10-toothed, the inner segments membranaceous and erect. Sterile florets; attached to the inside of the involucre. *Stamen* 1. *Filaments* articulated in the middle. Fertile florets solitary, central, stipulate, naked. *Stigmas* 3, 2-cleft. *Capsule* 3 lobed, 3 celled.

1 E Cyathophora. Somewhat shrubby, glabrous. *Leaves* alternate, oblong, petiolate, slightly toothed, panduriform, the upper ones red at the base. *Flowers* in terminal clusters. *Involucre* colored. *Capsule* smooth, 3-celled.

♄ Through the summer. 2 ft.

2 E Graminifolia. *Stem* erect, branching from the base, finely pubescent, small. *Leaves* scattered, linear, entire. *Flowers* fasciculate, terminal.

On the sea coast of Ga. and Florida.

3 E Hyericifolia. *Stem* erect, branching, spreading branches, divaricate. *Leaves* opposite, oval-oblong, slightly falcate, serrate, 3-nerved, spotted. *Flowers* in terminal corymbs, small.

☉ August—Sept. Fields. 1–2 ft.

4 E Maculata. *Stem* erect, spreading, or decumbent, dichotomously branched, slightly pubescent, usually purple. *Leaves* opposite on short petioles, serrate, oblong, hairy, 3-nerved, oblique at the base. *Flowers* axillary, solitary, crowded near the summit, inner segments of the involucre colored.

☉ June—Oct. Cultivated lands. 2–3 ft.

5 E Depressa. *Stem* procumbent, pubescent, slender, branches alternate. *Leaves* oval, opposite, slightly serrate, unequal at the base, hairy beneath. *Flowers* solitary, axillary, clustered towards the summit of the branches. *Stipules* 4 at each joint, plumose, inner segments of the perianth white, 4, small.

☉ Through the Summer. Cultivated lands, very common. 8–12 in.

6 E Cordifolia. *Stem* prostrate, branching, glabrous, with the branches alternate. *Leaves* unequal, and cordate at the base, oval, entire, glabrous, small. *Flowers* solitary, axillary, surrounded at the base, with plumose stipules, inner segments of the perianth white.

☉ Through the Summer. Cultivated lands. 8–15 in.

7 E Polygonifolia. *Stem* procumbent, branching, succulent, glabrous. *Leaves* oblong-ovate, linear-lanceolate, entire, obtuse. *Flowers* solitary in the divisions of the stem. *Stipules* subulate, simple.

♃ July—Sept. Sandy soils. On the sea shore. 8 in.

8 E Ipecacuanha. *Stem* procumbent, or erect, small glabrous. *Leaves* sessile, varying in form from obovate, lanceolate, to linear, opposite. *Flowers* solitary, axillary, on peduncles as long as the leaves. *Root* very long.

♃ April—July—Sandy soils.

9 E Purpurissima. *Stem* erect, very pubescent, somewhat dichotomous. *Leaves* opposite, sessile, elliptic, entire, slightly cordate, obtuse. *Flowers* solitary in the division of the stem, on peduncles about as long as the leaves, interior segments of the involucre white.

♃ April—July. Pine barrens. 12–18 in.

10 E Helioscopia. *Stem* erect, glabrous, branching. *Leaves* alternate,

obovate, scattered sessile, cuneate, finely serrate, the floral ones obovate, or broad-lanceolate. *Umbel* 5-cleft, with the small branches dichotomous. *Fruit* smooth.

☉ May. Damp clay soils. 12–18 in.

11 E Corollata. *Stem* erect, slightly hairy, usually simple. *Leaves* alternate, oval, petiolate, varying in form. *Flowers* in terminal umbels, conspicuous, the inner segments of the involucre petaloid, obovate.

♃ Through the Summer. Dry fields. 1–2 ft.

Var. Angustifolia. *Leaves* 3–4 inches long, linear-lanceolate, sessile, hairy beneath, the upper branches of the umbel dichotomous.

♃ May—Sept. Dry soils, very common. 1–2 ft.

12 E Paniculata. *Stem* slightly angled, hairy. *Leaves* large for the genus, entire, with revolute margins, hairy along the midrib beneath. *Flowers* terminal, somewhat paniculate. *Fruit* smooth.

♃ August—Sept. Middle Car. & Ga. 1–2 ft.

Order CXXXV. URTICACEÆ.

Flowers monœcious, or dicecious, scattered or clustered.—*Perianth* membranous, lobed, persistent. *Stamens* definite, 4–5, inserted into the base of the perianth and opposite its lobes. *Ovary* superior, simple. *Ovule* solitary, erect. *Stigma* simple. *Fruit* an indehiscent nut, surrounded by the perianth. Usually herbaceous plants, with alternate leaves, often covered with stings.

Genus I URTICA.

Flowers usually monœcious. *Sterile florets;* perianth of 4 leaves. *Stamens* 4. *Fertile florets;* perianth 2-leaved.—*Stigma* 1. *Seed* 1, shining.

1 U Pumila. *Stem* usually erect, succulent *Leaves* opposite, decussate, ovate, acuminate, serrate, 3-nerved, lower ones on rather long petioles.—*Flowers* monœcious, in clustered corymbs. *Stamens* usually 3.

☉ July. Wet grounds. 6–12 in.

2 U Urens. *Stem* erect, quadrangular, hairy, hispid. *Leaves* opposite, eliptic, 3-nerved, or partly 5-nerved, coarsely toothed, with white stings.—*Spikes* glomerate, by pairs. *Flowers* clustered. *Stinging Nettle.*

☉ June—July. Cultivated grounds.

3 U Chamœdroides. *Stem* erect, glabrous. *Leaves* opposite, ovate, hairy beneath, with white stings on the upper surface. *Flowers* in axillary clusters, the upper ones fertile, the lower sterile. *Perianth* hairy.

☉ Feb.—March. Southern Ga. 4–6 in.

4 U Dioica. *Stem* erect, branching, hispid. *Leaves* cordate, ovate-lanceolate, coarsely serrate. *Flowers* dicecious, in clustered, paniculate spikes; spikes 2 from each axil, covered with stings. *Large stinging nettle.*

♃ June—Aug. Waste places. 2–3 ft.

5 U Procera. *Stem* erect, pubescent, quadrangular. *Leaves* ovate-lanceolate, serrate, on fringed petioles. *Flowers* dicecious, in compact, clustered spikes.

♃ July—Aug. Wet soils. 3–4 ft.

6 U Capitata. *Stem* erect, furrowed, quadrangular. *Leaves* alternate, cordate-ovate, acuminate, serrate, 3-nerved. *Flowers* in sessile clusters.—*Spikes* solitary, lateral and axillary.

♃ June—July. Damp soils. 4–5 ft.

7 U DIVARICATA. *Stem* erect, branching, covered with stings. *Leaves* alternate, ovate, acuminate, smooth, serrate, on long, ciliate petioles. *Panicles* axillary, solitary, divaricately branched.
4 July—Aug. Damp, rocky situations. 2–3 ft.

8 U CANADENSIS. *Stem* erect, branching, hispid, with stings. *Leaves* alternate, cordate-ovate, acuminate, hispid. *Flowers* in axillary panicles, the lower ones sterile, the upper fertile.
4 July—August. Wet soils. 5-6 ft.

GENUS II PARIETARIA.

Flowers polygamous, surrounded by a many cleft involucre. *Perfect florets*: perianth 4-cleft. *Stamens* 4. *Style* 1. *Pistillate florets*: perianth 2–4-cleft. *Style* 1. *Seed* 1, enclosed by the perianth.

1 P PENNSYLVANICA. *Stem* simple, erect, striate, pubescent. *Leaves* alternate, linear-lanceolate, pubescent, with opaque dots. *Involucre* 3-leaved. *Flowers* in compact, axillary clusters. *Perianth* oblong, persistent, enclosing the seed.
☺ June. Upper dis. Car. & Ga. 12–15 in.

2 P FLORIDANA. *Stem* decumbent, with erect branches, pubescent near the summit. *Leaves* ovate, pubescent, dotted, sometimes nearly round.—*Flowers* in axillary clusters. Leaves of the involucre nearly linear.
☾ May—Oct. Damp, sandy soils. 12–18 in.

GENUS III HUMULUS.

Perianth diœcious. *Sterile florets*; perianth 5-parted.—*Stamens* 5. *Fertile florets*: scales of the ament large, persistent, concave, entire, 1-flowered. *Perianth* none. *Styles* 2. *Seed* 1.

1 H LUPULUS. *Stem* twining, scabrous. *Leaves* opposite, 3–5-lobed, scabrous, serrate. *Sterile florets*: paniculate, axillary and terminal. *Fertile florets*, verticillate and sessile.
4 August. Mountains.

GENUS IV BŒHMERIA.

Monœcious, or diœcious. *Sterile florets*; perianth 4-parted. *Stamens* 4. *Fertile florets*: perianth none. *Style* 1. *Nut* compressed.

1 B CYLINDRICA. *Stem* obtusely 4-angled, glabrous. *Leaves* opposite, ovate-oblong, acuminate, dentate, smooth. *Flower* diœcious. Sterile spikes clustered, interrupted. Fertile ones cylindrical.
4 June—Aug. Wet grounds. 2-3 ft.

2 B LATERIFLORA. *Stem* smooth, with opposite branches. *Leaves* alternate, ovate-lanceolate, acuminate, serrate, scabrous, on long petioles. *Flowers* in lateral and axillary clusters.
4 July. Shady woods.

ORDER CXXXVI. ULMACEÆ.

Flowers perfect, or polygamous. *Perianth* divided, campanulate, inferior. *Stamens* definite, 5–8, inserted into the

base of the perianth. *Ovary* superior, 2-celled, with solitary, pendulous ovules. *Stigmas* 2, distinct. *Fruit* 1–2-celled, membranous, or drupaceous. *Seed* solitary, pendulous.—Trees or shrubs.

Genus I ULMUS.

Flowers perfect. *Perianth* campanulate, 4–5-cleft. *Stamens* 5–8. *Styles* 2. *Fruit* compressed, with a broad membranaceous border.

1 U Americana. A large tree, with smooth, gracefully recurved branches. *Leaves* alternate, lanceolate, oblique, doubly serrate, with the serratures unctuate. *Flowers* 5–10 in a fascicle, pedicillate. *Fruit* fimbriate. *Styles* 2, short. *Fruit* 1-seeded, surrounded by a large, membranous wing.
White Elm.

♄ Feb.—March. Rich soils. 40–100.

2 U Fulva. A small tree. *Leaves* large, oval, doubly serrate, rough, sometimes slightly cordate, acuminate, pubescent. *Flowers* nearly sessile. *Stamens* 5–7. *Stigmas* purple. *Buds* tomentose. *Fruit* pubescent.
♄ Feb.—March. In fertile lands. 20–30 ft.

3 U Alata. A middle sized tree or shrub, with a cork like excrescence on opposite sides of the branches. *Leave* nearly sessile, oblong-lanceolate, doubly serrate. *Samara* pubescent, ciliate.
♄ Feb.—March. Fertile soils. 10–30 ft.

Genus II PLANERA.

Flowers perfect. *Perianth* campanulate, 3–5-cleft. *Stigmas* 2. *Nut* 1-seeded, roughened.

1 P Gemelini. A middle size tree. *Leaves* ovate, acute, glabrous, serrate. *Flowers* axillary, generally by threes. *Perianth* 3–5 cleft. *Stamens* 3–5. *Stigmas* 2, plumose. *Nut* roughened.
♄ Feb.—March. River swamps. 30–40 ft.

Genus III CELTIS.

Flowers perfect. *Perianth* 5 or 6 parted. *Stamens* 5 or 6. *Styles* 2, expanding. *Drupe* small, purple.

1 C Occidentalis. A large tree. *Leaves* ovate, acuminate, serrate, unequal at the base, pubescent beneath. *Flowers* small. *Fruit* a small berry, with a sweet pulp.
♄ April—May. Rich soils. 60–80 ft.

Order CXXXVII. ARTOCARPEÆ.

Flowers monœcious, in aments or heads. *Perianth* usually divided, sometimes tubular, or entire. *Stamens* 4, straight. *Ovary* 1 or 2 celled, with a suspended ovule. *Style* 1, filiform. *Stigma* bifid. *Fruit* a fleshy receptacle, covered by numerous nuts. *Seed* suspended, solitary. Trees or shrubs.

Genus I MORUS.

Genus same as the order.

1 M Alba. Monœcious. A small tree. *Leaves* deeply cordate, unequal at the base, unequally serrate, nearly glabrous. *White Mulberry.*
♄ May. Introduced.

2 M Rubra. Diœcious. A large tree. *Leaves* cordate, ovate, acuminate, serrate, scabrous, pubescent beneath. *Perianth* 4-parted, becoming juicy.
♄ March. Rich soils. 20–60 ft.

Order CXXPVIII. PODOSTEMEÆ.

Flowers naked, monœcious, bursting through an irregularly lacerated spathe. *Stamens* hypogynous, monadelphous, 2, or more, alternately sterile and shorter. *Ovary* 2-celled, with numerous ovules. *Stigmas* 2–3. *Fruit* capsular. *Seed* numerous, minute. Aquatic plants, with capillary leaves.—*Flowers* minute.

Genus I PODOSTEMUM.

Genus the same as the order.

1 P Ceratophyllum *Stem* floating, filiform. *Leaves* alternate, pinnate, many cleft *Flowers* axillary, solitary. *Stamens* 2, affixed to a common pedicel. *Stigmas* 2, sessile. *Capsule* ovate, 2-valved, 2-celled, many seeded.
♃ July. In the beds of rivers.

Order CXXXIX. CALLITRICHINEÆ.

Flowers perfect, with 2 fistular, colored bracts. *Stamens* 1. *Anther* reniform, 1-celled. *Ovary* solitary, 4-cornered, 4-celled. *Ovules* solitary. *Styles* 2, subulate. *Stigmas* simple points. *Fruit* indehiscent, 4-celled, 4-seeded. *Seed* peltate. Small aquatic, herbaceous plants. *Flowers* axillary, solitary, very minute.

Genus 1 CALLITRICHE.

Genus the same as the order.

1 C Heterophylla. *Stem* floating, creeping, round. Floating leaves, spathulate, immersed ones, linear, all opposite, sessile, entire. *Perianth* persistent, lanceolate, white. *Filament* subulate. *Styles* 2, subulate.
♃ May—June. Still waters.

Order CXL. SAURUREÆ.

Flowers naked, seated upon a scale. *Stamens* 6, hypogynous, filaments slender. *Anthers* cuneate. *Ovaries* 4, distinct, each with 1 ovule. *Stigmas* 3–4. *Fruit* consisting of 4 indehiscent nuts. Herbaceous plants, growing in marshy places. *Leaves* alternate, stipulate. *Flowers* in spikes.

Genus 1 SAURURUS.

Genus the same as the order.

1 S Cernuus. *Stem* erect, furrowed, with jointed hairs. *Leaves* cordate, pubescent, entire. *Flowers* in spikes, opposite the leaves. *Perianth* tubular, hairy, split on the upper side.
♃ May—July. Bogs and ponds, very common. 2–3 ft.

Order CXLI. AMENTACEÆ.

Flowers monœcious, or dicœcious. *Sterile florets* in aments, with scales, or scaly perianth. *Stamens* inserted into the scales. *Anthers* 2-celled. *Fertile florets* in aments, with scales or perianths. *Ovary* free, simple. *Stigmas* many.—*Fruit* a drupe, or a bony, membranaceous capsule, usually 1-celled. *Seed* 1, or many. Trees or shrubs.

Sub-Order I. SALICINEÆ.

Genus I SALIX.

Dicœcious. *Sterile florets;* ament cylindrical, scales 1-flowered, imbricate, with a nectariferous gland at the base. *Perianth* none. *Stamens* 1–5. *Fertile florets*; scales 1-flowered. *Perianth* none. *Stigmas* 2, often cleft. *Capsule* 1-celled, many seeded. *Seeds* comose.

1 S Muhlenbergiana. A small shrub, often decumbent, with pubescent branches. *Leaves* lanceolate, pubescent, hoary, entire, white, tomentose beneath. *Flowers* diandrous, appearing before the leaves. *Scales* oblong, villous along the margin, white, with a red apex. *Germs* ovate-lanceolate, on long pedicels, hairy. *Styles* short. *Stigmas* bifid.
♄ April. Dry woods. 2–5 ft.

2 S Tristis. A small shrub. *Leaves* linear-lanceolate, acute at each end, entire, with revolute margins, glabrous above, rugosely veined, and tomentose beneath. *Stipules* none.
♄ March—April. Sandy soils. 1–4 ft.

3 S Rosmarinifolia. A small shrub, the branches silky, pubescent.—*Leaves* linear-lanceolate, acute at each end, entire when young, pubescent above, silky beneath, becoming nearly glabrous when old; scales of the ament obtuse, ciliate. *Germs* lanceolate, villous. *Stigmas* bifid.
♄ March—April. Wet lands. 1–3 ft.

4 S Conifera. A small shrub, with the young branches pubescent, with cone like excresences at the extremities of the branches. *Leaves* oblong-lanceolate, acutely serrate towards the apex, glabrous on the upper surface, tomentose beneath, on long petioles. *Scales* lanceolate, villous. *Germs* lanceolate, villous. *Stigmas* 4.
♄ March—April. Dry soils. 4–8 ft.

5 S Discolor. A shrub, with brownish branches. *Leaves* oblong, somewhat obtuse, remotely serrate, glaucous beneath. *Stipules* lanceolate, serrate. *Stamens* 2; scales oblong, hairy, black. *Germs* lanceolate, tomentose.—*Stigmas* 2-parted. *Bog willow.*
♄ April. Low grounds. 8–15 ft.

6 S Nigra. A small tree branching from the base. *Leaves* alternate, lanceolate, slightly acuminate, serrulate on short petioles. *Stamens* usually 5. *Scales* obovate, obtuse villous. *Capsule* oblong, glabrous.

♄ March. On water courses. 15–20 ft.

I have a specimen sent me by W. S. Rockwell, Esq. from Baldwin Co. which he thinks is the *S Eriocephala*, but there being only a small branch of the fruit, I am unable to form an opinion respecting it.

Genus II. POPULUS.

Diœcious. Ament cylindrical. *Scales* lacerated. Sterile florets; anthers 8–30, arising from a turbinate, oblique, entire, single perianth. Fertile florets; perianth entire. *Stigmas* 4. *Capsule* superior, 2-celled, 2-valved, many seeded. *Seeds* comose.

1 P Grandidentata. A large tree, with a smooth greenish bark. *Leaves* alternate, nearly round, unequally and sinuately toothed, glabrous, villous when young, petioles compressed near the summit. *Flowers* in small axillary, cylindrical aments. *Cotton tree, or American aspen.*

♄ March. Mountains.

2 P Angulata. A large tree, with the branches winged. *Leaves* ovate, deltoid, acuminate, serrate, glabrous, with the serratures uncinate *Flowers* small.

♄ March. On the margins of rivers. 50–80 ft.

3 P Heterophylla. A large tree, branches terete. *Leaves* roundish, ovate, obtuse, uncinately toothed, the sinus small, cordate, and somewhat auricled, when young tomentose.

♄ May. Swamps. 60–80 ft

Sub-Order II. MYRICEÆ.

Genus III. MYRICA.

Diœcious. Ament ovate-oblong. *Scales* crescent shaped. Sterile florets; stamens 4–6. *Anthers* 4-valved. Fertile florets; ovary 1. *Stigmas* 2. *Drupe* 1-celled, 1-seeded.

1 M Cerifera. A small shrub, diffusely branched. *Leaves* perennial, alternate, somewhat coriaceous, linear-lanceolate, glabrous dotted, slightly pubescent when young. *Flowers* in short, cylindrical, axillary aments. *Stamens* 4. *Scales* nearly round. *Bayberry, or Wax Myrtle.*

♄ March—April. In damp soils.

2 M Caroliniensis. A small shrub. *Leaves* cuneate, oblong, coarsely toothed. *Scales* acute. *Fruit* globular, large.

♄ March—April. Wet places. 3–4 ft.

Genus IV. COMPTONIA.

Monœcious. Sterile florets. *Ament* cylindrical. *Scales* 1-flowered. *Perianth* 2-parted. *Stamens* 3-forked. *Anthers* 6. Fertile floret. *Ament* globose. *Scale* one-flowered. *Styles* 2. *Nut* ovate

1 C Asplenifolia. A small shrub. *Leaves* long, linear-lanceolate, alternate, irregularly pinnatifid. *Flowers* in oval, sessile aments. *Perianth* o

the sterile florets, reniform, acuminate, 1-flowered. *Filaments* 3. *Anthers* 6. *Nuts* forming a round burr. *Sweet fern.*

♄ April—May. Woods and fields. 2–4 ft.

Sub-Order III. BETULINEÆ.

Genus V. BETULA.

Monœcious. *Ament* cylindrical. Sterile florets with the scales peltate. *Stamens* 10–12. Fertile florets. *Scales* imperfectly 3-lobed, 3-flowered. *Styles* 2. *Nuts* compressed, with a membranaceous margin.

1 B Nigra. A tree, covered with smooth scaly bark, with long flexible branches. *Leaves* rhombic-ovate. doubly serrate, acute, pubescent beneath, entire at the base, on short petioles. *Fertile* ament, ovate. *Scales* villous, with equal and linear segments. *Red Birch.*

♄ May. Banks of streams. 30–40 ft.

2 B Lenta. A large tree, with long slender branches, which are spotted with white when young, with a fragrant and aromatic bark. *Leaves* cordate, ovate, acuminate, sharply serrate, nerves and petioles hairy, scales of the ament smooth.

♄ May. Mountains. 70–80 ft.

Genus VI. ALNUS.

Monœcious. Sterile florets; ament long, cylindrical.—*Scales* 3-lobed, 3-flowered. *Perianth* 4-parted. *Stamens* 4. Fertile florets; ament ovate. *Scales* 2-flowered. *Perianth* none. *Styles* 2. *Seed* compressed, ovate, naked.

1 A. Serrulata. A middle sized shrub, with numerous irregular branches. *Leaves* alternate, obovate, acuminate, with the veins on the under surface hairy, doubly serrate. Sterile flowers in long pendulous aments.

♄ February. Along water courses. Very common. 8–12 ft.

Genus VII. CARPINUS.

Monœcious. Sterile florets; ament long, cylindrical.—*Scales* ciliate at the base. *Stamens* 8–14, somewhat bearded at the top. Fertile florets; ament imbricate. *Scales* leafy, 2-flowered. *Stigmas* 2. *Nut* long, ovate, sulcate, 1-seeded.

1 C Americana. A small tree. *Leaves* oblong-ovate, acuminate, unequally serrate. *Scales* 3-parted, the middle segment oblique, toothed on one side. *Scales* of the fertile florets large, foliaceous. *Horn bean.*

♄ May. Woods. 15–20 ft.

Genus VIII. OSTRYA.

Monœcious. Sterile florets; ament cylindrical. *Scales* 1-flowered. *Filaments* branched. Fertile florets, ament naked. *Capsules* inflated, imbricate, 1-seeded at the base.

1 O Virginica. A small tree, with very compact, hard wood. *Leaves* ovate-oblong, cordate at the base, alternate unequally serrate. *Ament* oblong-ovate, erect, with inflated capsules, 1-seeded. *Iron-wood.*

♄ May. Woods. 20–30 ft.

Sub-Order IV. PLATANEÆ.

Genus IX. PLATANUS.

Monœcious. *Ament* globose. Sterile florets. *Stamens* numerous intermixed with linear scales. Fertile florets; scales spathulate. *Stigma* recurved. *Seed* clavate.

1 P Occidentalis. A large tree, with nearly white branches, with soft wood. *Leaves* 5-angled, obscurely toothed, pubescent beneath. *Aments* axillary, on long peduncles. *Seed* forming a compact head.
Button-wood or Sycamore.

½ May. Banks of streams. 60–70 ft.

Genus X. LIQUIDAMBAR.

Monœcious. Sterile florets; ament conical, with a 4-leaved involucre. *Perianth* none. *Stamens* numerous. Fertile florets; ament globose. *Perianth* 2-leaved, urceolate, 2-flowered. *Styles* 2. *Capsules* 2, 1-celled, many seeded.

1 L Styraciflua. A large tree. *Leaves* alternate, palmately lobed; lobes acuminate, serrate. Sterile ament terminating the branches. Fertile ament near the base of the sterile. *Sweet gum.*

½ May. Damp soils. 70–80 ft.

Sub-Order V. CUPULIFERÆ.

Genus XI QUERCUS.

Monœcious. *Sterile florets;* ament loose. *Perianth* mostly 5-cleft. *Stamens* 5–10. *Fertile florets;* capsule cap-shaped, scaly. *Perianth* 6-lobed. *Ovary* 3-celled, 2 of them abortive. *Style* 1. *Stigmas* 3. *Acorn* 1-celled, 1-seeded.

(*a*) *Fructification biennial. Leaves usually setaceously mucronate, entire.*

1 Q Phellos. A middle sized tree, slender and straight. *Leaves* deciduous, linear-lanceolate, tapering at both ends, glabrous, mucronate. *Acorn* small, nearly spherical *Willow oak.*

½ May. Swamps. 30–60 ft.

2 Q Imbricaria. A small sized tree, with irregular branches. *Leaves* deciduous, oblong, tapering at each extremity, mucronate, entire, pubescent beneath. *Cup* shallow; scales broad-ovate. *Acorn* small, nearly spherical. *Shingle oak.*

½ June. Banks of rivers, mountains. 40–50 ft.

3 Q Pumila. A small shrub. *Stem* slender, virgate, sparingly branched, tomentose when young. *Leaves* oblong-lanceolate, tapering towards the base, undulate, tomentose beneath. *Acorns* small, in a shallow cup.
Running oak.

½ March—April. In pine woods. 2–3 ft.

4 Q Virens. A large tree, with spreading, irregular branches. *Leaves* perennial, coriaceous, oval-lanceolate, with revolute margins, pubescent beneath. *Fruit* oval, nearly black, generally in pairs. *Live oak.*

½ April. Along the sea coast. 40–50 ft.

5 Q. Laurifolia. A middle sized tree. *Leaves* sessile, oblong-lanceolate, tapering at the base, entire, glabrous, the young leaves toothed and sometimes sinuate. *Acorn* ovate, in a shallow, nearly sessile cup.
ħ April. Rich, sandy soils. 40–50 ft.

(b) Leaves lobed at the summit.

6 Q. Aquatica. A small tree, with regular branches. *Leaves* obovate, cuneate, nearly sessile, obscurely lobed at the summit. *Acorn* ovate, rather small, in a shallow cup, on a short peduncle. *Water oak.*
ħ March—April. Damp soils. 30–70 ft.

7 Q. Nigra. A small tree, with thick, rough, black bark. *Leaves* coriaceous, cuneate, dilated at the summit, retusely 3-lobed, 5–7 inches long, ferruginous beneath *Acorn* ovate, mucronate, in rather a deep, sessile cup.
♃ March—April. In poor soils. 15–30 ft. *Black jack.*

8 Q. Tinctoria. A large tree, with dark colored bark. *Leaves* obovate, sinuate, mucronate, angled, glabrous on the upper surface. *Acorn* depressed, in a deep, sessile cup. *Black oak.*
ħ March—April. In rich uplands. 60–70 ft.

9 Q. Coccinea. A large tree. *Leaves* deeply sinuate, glabrous, with the lobes acute, notched and mucronate, petioles rather long. *Fruit* abundant. *Acorn* oblong, mucronate, in a deep cup.
ħ April. In rich lands. 70–80 ft.

10 Q. Rubra. A large tree. *Leaves* glabrous, oblong, sinuate, with the angles rather acute. *Lobes* acute and tapering, acutely notched, mucronate. *Acorn* large, mucronate, in a flat, shallow, sessile cup. *Red oak.*
ħ April. Dry soils. 70–80 ft.

11 Q. Catesbæi. A small tree, with stem and branches irregular and crooked. *Leaves* coriaceous, cuneate, sinuate, the lobes divaricate, usually simple. *Acorn* ovate, in a large, deep cup, sessile, with the scales obtuse.
ħ April. Poor, sandy soils. 15–30 ft.

12 Q. Falcata. A large, tree, with regularly expanding branches. *Leaves* on long petioles, deeply lobed, falcate, mucronate, shining on the upper surface, tomentose beneath. *Fruit* small, abundant, with a shallow cup.
ħ April—May. Common. 70–80 ft. *Spanish oak.*

Var. *(a)* Triloba. *Leaves* cuneate, nearly equally 3-lobed at the summit mucronate.

Var. *(b)* Pagodæfolia. *Leaves* oblong, many lobed, on rather long petioles, lobes simple, mucronate.

13 Q. Ilicifolia. A small shrub. *Leaves* cuneate, on long petioles, obovate, 3–5-lobed, tomentose beneath. *Fruit* abundant. *Acorn* ovate, in a shallow cup.
ħ April—May. Poor soils. 3–8 ft.

(b) Fructification annual. Leaves unawned.

14 Q. Obtusiloba. A middle sized tree, with irregular branches. *Leaves* oblong, sinuate, on short petioles, generally 5-lobed, the upper ones dilated, pubescent beneath. *Acorn* oblong, in a hemispherical cup. *Post oak.*
ħ April. In stony, clay soils. 30–40 ft.

15 Q. Lyrata. A large tree. *Leaves* long, irregularly lyrate, the lobes oblong, nearly acute, the upper ones dilated, glabrous. *Acorn* nearly globular, almost entirely enclosed in the cup. *Over-cup oak.*
ħ April. Swamps. 60–70 ft.

16 Q. Alba. A large tree. *Leaves* oblong, pinnatifid, sinuate, pubescent beneath, on short petioles. *Lobes* oblong, obtuse *Fruit* large, usually in pairs. *Acorn* ovate, in a deep cup. *White oak.*
ħ April. Rich soils. 70–80 ft.

17 Q. Prinus. A large tree, with a long trunk without branches. *Leaves* large, obovate, or oblong-lanceolate, obtusely toothed, slightly pubescent beneath. *Fruit* abundant. *Acorn* large, in a hemispherical cup.
ħ April. Common. 70–80 ft. *Swamp chestnut oak.*

18 Q Michauxii. A large tree. *Leaves* obovate, unequally toothed, sinuate, obtuse at the base, tomentose beneath. *Fruit* usually in pairs. *Acorn* large, ovate.
½ April. Rich soils. 60–80 ft.

19 Q Montana. A large tree. *Leaves* obovate, acute, tomentose beneath, coarsely toothed, teeth indurated at the point. *Acorn* ovate, in a hemispherical cup.
½ April. In rocky places near the mountains. 30–50 ft.

20 Q Castanea. A large tree. *Leaves* oblong-lanceolate, on long petioles, tomentose beneath, acuminate, coarsely toothed, teeth with indurated points. *Acorn* ovate, in a hemispherical cup. *Chestnut oak*
½ April—May. In rich, damp soils. 60–70 ft.

21 Q Chinquapin. A small shrub, with a smooth, slender stem. *Leaves* oblong-lanceolate, on short petioles, coarsely toothed, glabrous when mature *Acorn* ovate, in a hemispherical cup
½ April—May. Near the mountains. 3–4 ft.

Genus XII CASTANEA.

Monœcious. Sterile florets; ament naked, long, cylindrical. *Perianth* 6-lobed. *Stamens* 5–20. Fertile florets 3, within a muricated involucre. *Perianth* 5–6-lobed. *Styles* 6 *Seed* 1–3, enclosed by the involucre.

1 C Vesca. A large tree, generally with an erect trunk and irregular branches. *Leaves* lanceolate, oblong, mucronate, serrate, glabrous when old. Aments of the sterile flowers axillary. Florets in clusters. Fertile spikes short, 2 or 3 together. *Style* 1. *Stigmas* numerous. *Involucre* spinous.
½ May—June. Dry woods. 60–70 ft.

2 C Pumila. A shrub, or small tree. *Leaves* oblong, serrate, mucronate, tomentose beneath. Fertile florets generally one in each involucre. *Nut* small, enclosed in a spiny involucre. *Chinquapin.*
½ May. In light soils. 15–20 ft.

3 C Nana. A small shrub. *Leaves* oval-lanceolate, obtuse, serrate, mucronate, shining on the upper surface, slightly tomentose beneath. It agrees nearly with the preceding species, except in size.
½ May. Sandy, pine barrens. 2–4 ft.

Genus XIII CORYLUS.

Monœcious. Sterile florets; ament cylindrical. *Scales* 3-cleft. *Stamens* 8. Fertile florets; ovaries several. *Stigmas* 2. *Nut* ovate surrounded with the enlarged coriaceous and scaly involucre.

1 C Americana. A small shrub, with erect, virgate branches, pubescent when young. *Leaves* oblong-ovate, cordate, acuminate, pubescent on the under surface. *Involucre* roundish, campanulate, with the border dilated and many cleft. *Nut* large, ovate *Hazlenut. Wild filbert.*
½ March—April. Shady woods. 4–8 ft.

2 C Rostrata. A small shrub. *Leaves* oblong-ovate, acuminate, slightly cordate, on short petioles, doubly serrate, pubescent beneath. *Involucre* somewhat globular, hirsute, 2-parted at the summit, with incised segments.
½ March—April. Mountains. 3–4 ft.

Genus XIV. FAGUS.

Monœcious. Sterile florets; ament globose. *Perianth*

6-cleft. *Stamens* 5–12. Fertile florets 2, within a 4-lobed prickly involucre. *Perianth* with 4–6 minute lobes. *Ovaries* 3-celled, 2 of them abortive. *Styles* 3. *Nut* 1-seeded, enclosed by the involucre.

1 F Sylvatica. A large tree. *Leaves* ovate, acuminate, ciliate, slightly toothed, on short petioles. *Involucre* persistent. *Seed* triquetrous. *Beach.*
♄ March—April. Damp rich soils. 50–60 ft.

Order CXLII. JUGLANDEÆ.

Flowers monœcious. Sterile florets in an ament. *Perianth* oblique, membranous, scaly, irregularly lobed. *Stamens* 3–36, inserted on the receptacle. *Filaments* short. *Anthers* 2-celled. Fertile florets with the perianth 4–6-parted. *Ovary* 1-celled, with an erect solitary ovule. *Styles* 1–2, short, or wanting. *Stigmas* 2, and lacerated, or discoid, and 4-lobed. *Fruit* 1-celled, with 4 imperfect partitions. *Seed* 4-lobed. Trees, with alternate, unequally pinnate leaves.

Genus I. JUGLANS.

Monœcious. Sterile florets. *Scales* usually 5-parted, imbricate. *Perianth* 5–6.parted. *Stamens* numerous. Fertile florets; perianth double, each 4-parted. *Drupe* large, with the nut irregularly furrowed.

1 J Nigra. A large tree. *Leaflets* ovate-lanceoate, numerous, serrate, slightly cordate, pubescent beneath when young. *Fruit* spherical, scabrous, the pulp decaying and turning black. *Walnut.*
♄ April. Rich soils. 30–60 ft.

2 J Cinerea. A middle sized tree. *Leaflets* numerous, lanceolate, pubescent, on villous petioles. *Fruit* oblong-ovate, acuminate, irregularly grooved. *Butternut.*
♄ April. Fertile soils. 30–50 ft.

Genus II. CARYA.

Monœcious. Sterile florets; ament imbricate. *Scales* 3-parted. *Perianth* none. *Stamens* 4–6. Fertile florets; perianth 4-cleft, superior. *Style* none. *Stigma* 4-lobed. *Pericarp* 4-valved. *Nut* quadrangular, smooth.

1 C Sulcata. A large tree. *Leaves* pinnate. *Leaflets* obovate, lanceolate, serrate, pubescent beneath, 7–9. Sterile aments pendulous, 3-parted. Fertile florets terminal. *Nut* covered with a thick pericarp. *Thick shell bark Hickory.*
♄ April. Fertile soils. 60–80 ft.

2 C Alba. A large tree, with the bark separating in flat scales. *Leaves* pinnate; leaflets large, oblong-lanceolate, serrate. *Nut* nearly spherical, with the pericarp thin. *Shag bark hickory.*
♄ April. Fertile soils. 40–60 ft.

3 C Tomentosa. A large tree. *Leaves* pinnate; leaflets obovate-lanceolate, acuminate, slightly serrate, pubescent beneath, 7–9. *Ament* tomentose,

very long. *Fruit* sub-globose, smooth, with a thick pericarp. *Nut* somewhat 6-angled, with a thick, hard shell. *Common hickory.*

♄ April—May. Fertile soils. 40–60 ft.

4 C Amara. A large tree. *Leaves* pinnate; leaflets sessile, ovate-oblong sharply serrate, acuminate, glabrous, except the veins and midrib. *Fruit* small, bitter and astringent. *Bitter nut.*

♄ May. Fertile woods. 40–50 ft.

5 C Porcina. A large tree. *Leaves* pinnate; leaflets lanceolate, 7–9, glabrous. *Fruit* small, with a hard, smooth nut, very bitter. *Pig nut hickory.*

♄ April. Margins of swamps. 70–80 ft.

6 C Aquatica. A middle sized tree. *Leaves* pinnate; leaflets narrow, lanceolate, oblique, slightly serrate, glabrous, 9–13, with the midrib tomentose. *Fruit* nearly round, angled.

♄ April. Swamps. 40–60 ft.

APPENDIX

OF

OMISSIONS, ADDITIONS AND CORRECTIONS.

Page 25. GENUS CORONOPUS. (*Syn. Senebiera.*) [Order Cruciferæ to succeed Lepidium.]

Silicle reniform, didymous, compressed contrary to the septum, sometimes 1-celled; cells 1-seeded; seeds globose-triquetrous. Herbaceous plants with small white flowers.

1 C DIDYMA. *Stem* branching, lying flat on the earth. *Leaves* alternate, sessile, pinnately divided: the lobes 3-4-parted, toothed or incised, mucronate. *Flowers* in small corymbs, opposite the leaves; but by the elongation of the rachis, the fruit is in racemes. *Calyx* 4-leaved. *Petals* none, or very minute. *Silicle* emarginate.

White. ☉ or ♂ February—June. Open, dry fields, common.

2 C RUELLII. Resembles the preceding, and grows with it. *Leaves* pinnately divided; segments entire, toothed, or pinnatifid. *Flowers* few. *Style* prominent. *Silicle* entire, not emarginate.

Page 216. GENUS GRATIOLA. [Order Schropularineæ p. 216, to precede Gerardia.]

Calyx 5-leaved or 5-parted, often with 2 bracts at the base. *Corolla* irregular, resupinate. *Stamens* 2–4; when 4, two of them sterile. *Capsule* 2-celled.

(a) 2 bracts at the base of the calyx.

1 G VIRGINICA. *Stem* succulent, somewhat furrowed, not quite terete, erect or declined. *Leaves* sessile, obscurely 3-nerved. *Flowers* axillary, on short peduncles; lobes of the calyx nearly equal, with the bracts about equal to the segments. *Corolla* curved. *Stamens* 2, short. *Capsule* ovate, 2-celled, 2-valved. *Seeds* numerous.

White, tinged with red. ♃ March—April. Wet places. 3–8 in.

2. G. AUREA. *Stem* procumbent, glabrous, terete, slightly furrowed, jointed. *Leaves* ovate-lanceolate, somewhat amplexicaule, obscurely 3-nerved, acutely serrate, dotted. *Flowers* axillary, solitary, on short peduncles. Bracts as long as the segments of the calyx.

Yellow. ♃ April—June. Wet pine barrens. 1-2 ft.

3. G. Pilosa. *Stem* erect, terete at the base, square at the summit, hairy. *Leaves* oval, amplexicaule, serrate, rugose. *Flowers* axillary, solitary. *Sepals* unequal. *Capsule* smooth.

White, tinged with purple. ♃ In wet places, common. July—Sept.

4. G. Sphærocarpa. *Stem* procumbent, jointed, terete, furrowed. *Leaves* sessile, obovate, serrate, obscurely 3-nerved. *Flowers* solitary, axillary. *Sepals* equal. Bracts, larger, expanding. *Stamens* 2. *Style* short. *Capsule* globose. *Seeds* numerous.

♃ Sept.—Oct. In ponds.

(b) Calyx without bracts

5. G. Quadridentata. *Stem* procumbent, terete, pubescent, slightly furrowed. *Leaves* opposite, subulate, with 2 teeth near the summit. *Flowers* solitary, axillary. *Sepals* unequal. *Anthers* white.

White, tinged with yellow and purple. ♃ Around ponds.

6. G. Tetragona. *Stem* procumbent, square, jointed, glabrous. *Leaves* sessile, lanceolate, slightly toothed, obscurely 3-nerved. Flowers, solitary, axillary, on square peduncles. *Sepals* linear, equal. *Capsules* oblong.

White, streaked. ♃ In water. Sept.—Nov.

7. G. Acuminata. *Stem* erect, square, glabrous. *Leaves* lanceolate, toothed at the summit. *Flowers* solitary, axillary; *Stamens* 4, fertile. *Capsule* compressed, acute.

♃ August—Sept. Wet places. 12–18 in.

8. G. Megalocarpa. *Leaves* lanceolate, serrate, pubescent. *Flowers* opposite, on peduncles longer than the leaves. *Sepals* linear. *Capsule* large, globose.

Yellow. ♃ July—Aug. Wet places.

Page 295. ## Genus I. AMARANTHUS—Order AMARANTHACEÆ.

Flowers monœcious: sterile florets; calyx 3–5-leaved. *Stamens* 3 or 5. Fertile florets 3–5-leaved. *Styles* 3. *Capsule* 1-celled, 1-seeded.

1. A. Lividus. *Stem* erect, glabrous, usually purple. *Leaves* alternate, ovate or eliptic, slightly undulate, veins prominent. *Flowers* clustered, axillary and terminal, with the sterile and fertile intermingled. *Stamens* 3. *Styles* 2 or 3.

⊙ June—Sept. Cultivated lands, common. 2–3 ft.

2. A. Pumilus. *Stem* procumbent, fleshy, glabrous, usually purple. *Leaves* ovate, fleshy, obtuse, emarginate. *Flowers* in sessile, axillary clusters. *Perianth* 5-leaved. *Stamens* 5. *Styles* 3.

⊙ August—Oct. On the sea coast. 1–2 ft.

3. A. Sanguineus. *Stem* naked. *Leaves* red, oblong, acute. *Flowers* in terminal, erect racemes. *Branches* expanding, glabrous. *Stamens* 5.

⊙ July—Aug. Cultivated grounds. 2–3 ft.

4. A. Hypocondriacus. *Stem* erect, glabrous, furrowed. *Leaves* large, oblong, lanceolate, entire, red or purple, on long petioles. *Flowers* in compound, paniculate racemes. *Perianth* purple, 5-leaved. *Stamens* 5. *Styles* 3.

⊙ June—Oct. Cultivated grounds. 4–8 ft.

5. A. Spinosus. *Stem* erect, glabrous, much branched. *Leaves* lanceolate, mucronate, entire with 2 spines at the base of the petiole. *Flowers* in compound axillary and terminal racemes. *Stamens* 5. *Styles* 3.

⊙ June—Oct. Cultivated grounds. 2–3 ft.

Genus II. OPLOTHECA.

Perianth double, the exterior 2-leaved, truncate; the interior 5-cleft, tomentose. *Stamens* 5, monadelphous. *Capsule* 1-seeded, enclosed in the calyx.

1 O. Floridana. *Stem* erect, branching at the summit, pubescent, with swollen joints. *Leaves* opposite, sessile, linear-lanceolate, woolly beneath. *Flowers* in paniculate spikes. The inner perianth tomentose.
4 June—Sept. Middle and Western Ga.

Genus III. IRISINE.

Flowers dicœcious. Sterile florets; perianth double, exterior one 2–3-leaved. The interior 5-leaved, petaloid. *Stamens* 5, with glands between the filaments. Fertile florets; the inner perianth surrounded by long hair. *Stigmas* 2. *Capsule* ovate, 1-celled, 1 seeded.

1. J. Cyperoides. *Stem* erect, glabrous, with opposite branches, fistulous, furrowed. *Leaves* opposite, attenuate at the summit, lanceolate, irregularly serrate, swollen at the joints.
☺ Sept.—Oct. On the sea coast. 3–4 ft.

Genus IV. ACHYRANTHES.

Perianth double, exterior one 3-leaved, the interior 5-leaved, unequal. *Stamens* 5, sitting on a nectary. *Style* 1. *Capsule* 1-celled, 1-seeded.

1 A. Repens. *Stem* procumbent, hairy. *Leaves* opposite, usually unequal, lanceolate, somewhat hairy beneath. *Flowers* in sessile, ovate heads, somewhat 3-angled; the interior calyx hairy near the base; the two interior sepals smaller than the others, hairy at the summit. *Forty knot.*
4 March—Oct. Cultivated grounds. Low country.

Page 99. Genus ITEA. [Order Saxifragaceæ, to succeed Lepuropetalon.

Calyx campanulate, 5-cleft, with subulate segments. *Petals* 5, inserted into the tube of the calyx, linear-lanceolate, with incurved points. *Stamens* 5, alternate with the petals. *Style* 1. *Stigma* capitate, 2-lobed. *Capsule* 2-celled, with a central placenta.

1. J. Virginica. A shrub with flexible, pubescent branches. *Leaves* alternate, lanceolate, acuminate, serrulate, on short petioles. *Petals* pubescent on the inside. *Style* furrowed. *Flowers* in terminal, simple racemes. *Seeds* numerous.
White. 4 April—May. Wet soils, common. 3–6 ft.

Page 107. GENUS ARALIA. [Order Araliaceæ, to precede Panax.]

Flowers usually perfect. *Calyx* entire, or 5-toothed. *Petals* 5, spreading. *Stamens* 5, alternate with the petals, short. *Styles* 5. *Fruit* baccate, 5-lobed, 5-celled, with a solitary suspended seed in each cell. Herbs and shrubs, when thelatter, prickly.

1. A. RACEMOSA. *Stem* much branched, glabrous. *Leaves* compound, 3-parted, with the divisions 3-5-leaved; leaflets glabrous, ovate, acuminate, acutely serrate, frequently cordate; petioles pubescent. *Flowers* in umbels, disposed in racemose panicles, small, greenish white. *Spikenard.*
♃ July. Mountains. 3-5 ft.

2. A. SPINOSA. A shrub, or small tree. *Stem* usually prickly, scarcely branched. *Leaves* crowded at the summit of the stem, bipinnate; leaflets ovate, acuminate; petioles often 2-3 feet long. *Flowers* in terminal panicles. *Petals* oval, reflected, caducous. *Styles* 5, short.
White. ♄ June—Aug. COMMON. 5-40 ft.

3. A. NUDICAULIS. *Stem* short or none. *Leaf* 1, radical, with the petiole elongated, 3-cleft, each division pinnately 5-foliate, leaflets oblong ovate, acuminate, serrate. *Flowers* in 3 umbels without an involucre. *Sarsaparilla.*
Greenish white. June—July. Mountains. 12–18 in.

Page 56. GENUS BERCHEMIA. (*Zizyphus of Ell.*) [ORDER Rhamnaceæ, to precede Rhamnus.

Flowers diœcious. *Calyx* tubular, 5-parted with erect segments. *Petals* 5, convolute. *Stamens* enclosed by the petals. *Ovary* half enclosed in an annular disk. *Stamens* 5. *Style* 1. *Fruit* drupaceous, with a long, 2-celled nut. *Flowers* in small racemose panicles. A climbing shrub, with tough, flexible, pendant branches.

1. B. VOLUBILIS. *Leaves* ovate, ribbed, slightly undulate, mucronate, glabrous. *Flowers* in small umbels, racemes, or panicles, axillary and terminal. *Fruit* drupaceous, 1-2-seeded, purple.
♄ May—June. In rich, damp soils. 12–15 ft.

Page 285. GENUS MARISCUS. [Order Cyperaceæ, to precede Kyllingia.]

Flowers in spikes, clustered in heads. *Spikes* 1–8-flowered. *Stamens* 3. *Style* 2-cleft. *Seeds* and stem triquetrous. *Seed* naked.

1. M. RETROFRACTUS. *Stem* naked, pubescent, obtusely 3-angled. *Leaves* pubescent, linear. *Spikes* 1-3-flowered, reflexed, collected into an obovate head. *Seed* oblong, destitute of bristles.
June—Aug. Cultivated lands. Common. 1-2 ft.

2. M. CYLINDRICUS. *Stem* naked, pubescent, obtusely 3-angled. *Leaves* linear, channeled, glabrous. *Spikes* 2-4 flowered, crowded, compressed.—*Glumes* keeled acute. *Seed* acute without bristles.
June—Aug. Common. about cultivated fields. 2-3 feet.

3. M. Echinatus. *Stem* glabrous, obtusely 3-angled. *Leaves* linear, channeled, glabrous. *Spikes* 6–8 flowered, linear-lanceolate, in globose heads; flowers in 2 rows. *Stamens* usually 5.
June—Oct. Common. 1–2 ft.

Page 39. Genus MOLLUGO. [To precede Sagina under Caryophyllaceæ.]

Sepals 5, united at the base. *Petals* 5, minute, or more frequently none. *Stamens* 3–5, opposite the sepals. *Styles* 3. *Capsule* 3-valved, 3-celled, many seeded.

1. M. Verticillata. *Stem* prostrate, branching, glabrous. *Leaves* spatulate, those towards the summit lanceolate, generally verticillate, with 6 in a whorl. *Flowers* axillary in sessile umbels. *Sepals* expanding, 3-nerved, with membranaceous margins. *Stamens* usually 3. *Styles* 3. *Stigmas* plumose.
April—Sept. Common.

Page 221. Genus MITREOLA. (*Syn. Ophiorrhiza.*) [To precede Houstonia in Order Gentianeæ.]

Calyx tubular, 5-cleft. *Corolla* funnel-shaped. *Stamens* 5. *Stigmas* 2. *Fruit* 2-lobed.

1. M. Sessilifolia. *Stem* erect, somewhat branched, nearly square, scabrous towards the summit. *Leaves* ovate, opposite, appressed. *Flowers* in secund spikes, erect at first, afterwards recurved; throat of the corolla closed by jointed hairs, segments expanding, tube short. *Fruit* consisting of 2 carpels united at the base and apex. *Seeds* numerous. [Sent to me by Wm. S. Rockwell, Esq. of Baldwin County.]
White. ☉. July—Aug. Wet places. 12–18 in.

2. M. Lanceolata. *Stem* erect, 4-angled, 4-furrowed, glabrous. *Leaves* lanceolate, attenuate at the base, scabrous on the upper surface, tube of the corolla as long as the calyx, purple, segments white.
Purple and white. ☉ August—Sept. Wet soils common. 12—18 in.

Page 231. Genus ATROPA. [To succeed Physalis in Order Solaneæ.

Calyx with acute angles, somewhat sagittate at the base. *Corolla* campanulate. *Stamens* 5, distant. *Style* 1. *Fruit* baccate, globose, 2-celled.

1. A. Physaloides. *Stem* erect, much branched. *Leaves* alternate, sinuate, angled, ovate, glabrous. *Flowers* axillary, solitary.
Blue. ☉ June—Sept. Cultivated lands.

Page 254. Genus POLYGONATUM. [To succeed Convallaria in Order Smilaceæ.

Perianth 6-cleft, cylindrical. *Stamens* 6, inserted near the summit of the tube. *Fruit* baccate, 3-celled, with 2 seeds in each cell.

1. P. Biflorum. *Stem* erect, glabrous. *Leaves* cliptic-lanceolate, sessile, alternate, 3-nerved. *Peduncles* axillary, solitary 2-flowered.
Pale yellow. ☉ July—Aug. 12–18 in.

2. P. Multiflorum. *Stem* erect, terete. *Leaves* oblong, oval, broader than the preceding species, amplexicaule, usually 7-nerved. *Peduncles* long, axillary, several flowered.
Pale yellow. ☉. April—August. Common. 15–24 in.

3. P. Pubescens. *Stem* slightly furrowed. *Leaves* ovate, alternate, amplexicaule, pubescent beneath. *Peduncles* short, axillary, usually 2-flowered.
☉ May—June. On the banks of rivulets. 1–2 ft.

Genus SMILACINA.

Perianth 6-parted, expanding. *Stamens* 6, expanding, inserted into the base of the segments of the perianth. *Fruit* baccate, 3-celled.

1. S. Umbellata. *Stem* erect, pubescent. *Leaves* embracing the base of the stem, oblong-oval, many nerved, attenuate at the base, ciliate. *Flowers* in a small terminal umbel
Pale yellow. ♃ May—Aug. 12–15 in.

2. S. Racemosa. *Stem* geniculate, leafy. *Leaves* oblong, sessile, acuminate, many nerved. *Flowers* in terminal racemes, crowded.
Nearly white. ♃ June—July. Common. 1–2 ft.

Page 210. Genus PRIVA. (*Syn. Phryma.*) To precede Verbena in Order Verbenaceæ.

Calyx tubular, 5-ribbed, bilabiate, upper lip 3-cleft, lower one 2-toothed. *Corolla* bilabiate, with the upper lip much the smallest and emarginate. *Fruit* 1-seeded.

1. P. Leptostachya. *Stem* erect, pubescent, somewhat branched. *Leaves* opposite, ovate, spatulate, toothed. *Flowers* in a terminal spike, with 3 bracts at the base of each flower. *Calyx* reflected after flowering.
White, tinged with purple. ♃. Rich soils. June—Sept. 10–15 in.

Page 217. Genus PEDICULARIS. [To succeed Seymeria in order Schrophularineæ.]

Calyx 2-cleft at the summit, obliquely truncate. *Corolla* ringent with the upper lip emarginate, compressed. *Stamens* 4. *Capsule* 2-celled, mucronate, oblique. *Seeds* few in each cell, slightly angled.

1 P. Canadensis. *Stem* simple, succulent, pubescent. *Leaves* pinnatifid, with the segments notched and toothed, the lower ones crowded, with compressed petioles. *Flowers* in leafy spikes; lower lip of the corolla 3-lobed, middle lobe smallest.
Yellow, tinged with purple. ♃. March—April. Common. 6–12 in.

Genus EUCHROMA.

Calyx tubular, 2–4-cleft, ventricose. *Corolla* bilabiate

with the upper lip very long, enclosing the stamens; lower lip trifid, short. *Stamens* 4. *Capsule* compressed, 2-celled, many seeded.

1. E. COCCINEA. *Stem* pubescent. Radical leaves lanceolate, entire, hairy, cauline ones pubescent, divided into 3 linear segments. *Flowers* in a terminal spike. *Bracts* large, red.
Yellowish. ☉ or ♂. June—Aug. Common. 12–18 in.

GENUS MELAMPYRUM.

Calyx 4-cleft; upper lip of the corolla compressed, with the margins folded back; lower lip trifid, grooved. *Capsule* oblique, 2-celled, 2 seeds in each cell.

1. M. AMERICANUM. *Stem* erect, branching, terete; lower leaves linear, entire, the upper lanceolate, toothed at the base, all opposite. *Flowers* axillary, solitary. *Seeds* oblong, cartilaginous.
Yellow. ☉ June—July. Mountains.

Page 25. GENUS THLASPI. (*Syn. Cypselea.*) [To succeed Lepidium in Order Cruciferæ.

Silicle triangular, cuneiform; valves boat-shaped, wingless, coriaceous; cells small, many seeded.

1. T. BURSA-PASTORIS. *Stem* erect, furrowed, slightly branched. Radical leaves pinnatifid, tapering at the base into a petiole. Cauline leaves small, entire, or with a few teeth, connate, lanceolate, pubescent. *Flowers* in elongated racemes.
White. ☉ _Sent to me by Wm. S. Rockwell Esq., Baldwin Co. 12 in.

Page 121. GENUS HOPEA. [To precede Styrax in Order Styraceæ.]

Calyx superior, 5-cleft. *Petals* 5. *Stamens* numerous, collected into 5 parcels. *Style* 1. *Fruit* drupaceous, with a 3-celled nut.

1. H. TINCTORIA. A small tree or shrub, with expanding branches and smooth bark. *Leaves* lanceolate, serrulate, crowded near the summit of the branches, shining on the upper surface. *Flowers* in axillary clusters, sessile. *Calyx* campanulate with scales at the base.
Yellow. ♄ March—April. In rich soils. 4–20 ft.

Page 194. GENUS GAILLARDIA. [To precede Baldwinia in Order Compositæ.

Involucre many leaved; leaves in 2 series, with a foliaceous appendix. *Receptacle* convex, hairy. Ray florets neutral, 3-parted. Disk florets perfect. *Pappus* chaffy, awned. *Seeds* oblong, villous.

1. G. Lanceolata. *Stem* erect, pubescent, slightly branched. *Leaves* alternate, linear-lanceolate, sessile, with a few serratures, ciliate. *Flowers* solitary, terminal. Florets of the ray dilated at the summit, 3-cleft. *Pappus* 8 or 9-leaved; leaves terminated by a long awn.

Yellowish or purple. ♃ May—August. Middle Georgia. Pine barrens. 1-2 feet.

Page 201. ORDER VALERIANACEÆ.

Calyx a border, 3-4-toothed, or pappus-like. *Corolla* tubular, rather irregular, with the border 5-parted, inserted on the top of the ovary, slightly calcarate at the base. *Stamens* 1–5, but usually 3. *Style* 1. *Ovary* 1-celled, with only 1 fritile; ovule suspended. *Fruit* dry indehiscent, with two empty cells, and one with a single seed. Herbaceous, rather succulent plants, with opposite, or whorled leaves. *Flowers* in crowded corymbs.

Genus I. FEDIA.

Genus the same as the Order.

1. F. Radiata. *Stem* erect, winged or furrowed by the decurrent leaves and midribs, pubescent on the angles and wings. *Leaves* opposite; lower ones somewhat spatulate, upper ones sessile, broad-lanceolate, rather obtuse, finely ciliate, irregularly dentate, sometimes nearly panduriform. *Flowers* terminal; in dichotomous corymbs, with a flower in each division, crowded, each corymb having the appearance of only 4 flowers, with a several leaved involucre; corolla slightly irregular at the summit, slightly calcarate near the base.

White. March—May. On the Ocmulgee above Macon. 10–15 in.

Page 202. PLANTAGO PUSILLA.

Scape erect, minutely dubescent. *Leaves* linear, entire, or with one tooth on each side near the summit. *Spike* cylindrical, loosely flowered. *Stamens* 2-4.

White. ☺ April. Abundant about Macon.

Page 1—Third line from the bottom read *corolla* for *coral*.
" 11—For *Schirandraceæ*, read *Schizandraceæ*.
" 25—In Caparidaceæ after imbricate insert *free*.
" 32—In Cistaceæ, 1st line read *outer* for *ovate*.
" 51—Fourth line from the top erase the period before *capsule*.
" 55—In Sapindaceæ read *ovule* for ovals,
" "—In Sapindus read *Petioles* for Petals,
" 58—Third line, for *deficient* read *definite*; 12th line for 19 read 10,
" 79—In Geum read *Carpels numerous* for *Carpels* 5.
" 89—In Œnothera read *Stamens* 8. *Ovary* instead of *Stamens* 8—*ovary*,
" 90—First line read *longer* for *larger*.
" 109—Fifth line read *Halesia* for *Halisia*.
" 254—Third line from the bottom read *Majalis* for *Masalis*.

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☞ The Roman numerals refer to the page in the Analysis.

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VOCABULARY AND INDEX

TO

PART I.

☞ The figures refer to the page in the First Part.

Acaulis, without stem.
Accrete, fastened to another body, and growing to it.
Accumbent, when the edges of the cotyledons are presented to the radicle.
Acerose, needle-shaped.
Achænium, p. 96.
Achlamydeous, flowers with no floral envelops. p. 70.
Acicular, resembling needles.
Acinaciform, scimitar shaped, curved, fleshy, with the concave border thick, the convex border thin.
Acotyledons, p. 45.
Acrogens, p. 45.
Aculeate, prickly; furnished with prickles, as the rose.
Acuminate, terminating very gradually in a point.
Acute, terminating in a point, without tapering.
Adansonii digitata, p. 40.
Adnate, adhering to the face of a thing, p. 83.
Æstivation, the mode in which the sepals or petals are folded in the flower bud.
Aggregati. p. 97.
Air cells. p. 32.
Ala. p. 75.
Ale, p. 74
Albumen, p. 104.
Alburnum, p. 41.
Alismaceous, p. 74.
Alternate, one above another, on opposite sides.
Amentum or *Ament*, p. 78.
Amnios, p. 102.
Amphisarca, p. 99.
Amphitropous, p. 93.
Amplexicaul, leaves embracing the the stem by their bases.
Amylaceous, resembling starch.
Anatropous, p. 93.
Anastomosing, the opening of one vessel into another.
Anatomy of Vegetables, 14.
Angular, having sharp edges.
Animalcules, microscopic animals 85.
Annular Ducts, 29.
Annulus in the form of a ring.
Anther, 80 *and* 82.
Anthocarpi, 100.
Anthocyane, 143.
Anthoxanthine, 13.
Apetalous, without petals.
Apocarpi, 96.
Apocarpous, 89.
Appendages, 74.
Appendix, 75.
Arcuate, bent in the form of a bow.
Aril, 96.
Articulated, united by a joint
Ascending, 93.
Assurgent, rising from a horizontal position.
Attenuate, tapering, gradually diminishing in width.
Autodiacrisis, 138.
Autosyncrisis, 138.
Auriculate, having two small rounded lobes at the base.
Awned, having a bristle.
Axillary, arising from an axil, formed by a leaf and the stem.
Axis, 80.

B.

Bacca, 100
Baccate, having the form of a berry.
Balausta, 100.
Bark, 36.
Beak, 75.
Berry, (see bacca.)
Bidentate, having two teeth.
Bifid, split in two.
Bifoliate, two leaved.
Bilobus, two lobed.
Bipinnate doubly pinnate.
Biternate, twice ternate.
Boabab tree. 40.
Boat-shaped, having the figure of a boat, being concave and tapering at each end, with a keel externally
Botany, definition of, 13.
Bothrenchyma, 25.

Brachiate, when the ramifications proceed from a common axis, nearly at right angles.
Bracts, 75.
Branched, divided into many branches.
Buds, 50.
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C.

Caducous, falling very early.
Cæspitose, forming dense patches or turfs.
Calcar, 75.
Calyciflorœ, stamens attached to the calyx.
Calyx, 70.
Cambium, the descending elaborated sap.
Campanulate, bell-shaped. 72.
Campulitropous, or *Campylotropous*, 92.
Canescent, hoary, greyish white.
Capillary, of the size of a hair.
Capitate, arranged in heads.
Capitula, the heads of compound flowers.
Capitulum, 77.
Capsular, 99.
Carcerulus, 98.
Carina, 74.
Carinate, keeled,
Carneus, flesh-colored.
Carpel, each of the leaves of which the ovary is composed.
Carpology, 96.
Cartilaginous, hard and tough.
Caruncle, or *Carunculous*, an enlargement of the testa, in the form of lumps or protuberances, about the umbilicus of the seed.
Caryophyllous, 74.
Caryopsis, 97.
Catkin, 79.
Caudate, with a long and slender point like the tail of some animal.
Cauliculus, 102.
Cauline, belonging to the stem.
Caulis, stem.
Cellular System, 16.
Cellular Integument, 36.
Centrifugal inflorescence,
Centripetal inflorescence, 78.
Ceratium, 99.
Chalaza, 93—102.
Channeled, — having longitudinal grooves.
Chlorophyll, see Chromule.
Chromule, 141.
Ciliæ, fine hairs arranged on the margin of an organ.
Ciliate, having fine hairs on the margin, resembling the eyelash.
Cinenchyma, 29.
Cinerius, ash-grey, a mixture of white and black.
Circinate, 54.
Circulation, 134.
Circumscissile, 95.
Cirrhose, a pinnate leaf, terminated by a tendril.
Cirrhous, terminated by a spiral, filiform appendage.
Cirrhus, see Tendril.
Clavate. club-shaped.
Claw, 72. see Unguiculate.
Club-shaped, — gradually thickening from the base to the apex.
Clustered, collected in parcels.
Coleorhiza, 103
Color, 141.
Columella, the axis of the fruit.
Columna, 82.
Coma, 102.
Compound, having various divisions, or ramifications.
Compressed, flattened lengthwise.
Conceptaculum, 98.
Conducting tissue, 87.
Conduplicate, 53.
Cone, see Strobilus.
Confounded, 70.
Connate, when the bases of two opposite leaves are united together.
Connectivum, 82.
Continuous Bothrenchyma, 26.
Contorted, twisted.
Convolute, 54.
Cordate, heart-shaped.
Coriaceous, leathery, having the consistence of leather.
Cormus, 48.
Corneus, horny, hard and very compact in texture.
Cornua, 75.
Corolla, 71.
Corona, 75.
Corrugate, wrinkled or folded up irregularly in every direction.
Corymb, 77.
Corymbose, in the form of a corymb.
Cotyledon, 102.
Cremocarpium, 100.
Crenate, when the teeth are rounded, the organ is said to be crenate.
Crested, having an elevated, irregular, or notched ridge.
Cruciate or *Cruciform*, 74.
Cucullate, hooded; a plain body with the apex and sides turned inwards, so as to resemble a hood.
Culm, the stem of grasses.

Cuneate, wedge-shaped with the apex of the wedge next the stem.
Cuspidate, tapering into a rigid point.
Cuticle, 33.
Cyanic, blue, 142.
Cyclosis, 30 and 137.
Cyme, 78.
Cynarrhodum, 97.
Cypsela, 99.
Cytoblast, 24.

D.

Deciduous, falling off at maturity.
Declining, falling gradually back from the perpendicular.
Decompound, 65.
Decumbent, reclining upon the earth, and rising again from it at the apex.
Decurrent, running downwards from the point of insertion.
Decussate, arranged in pairs that alternately cross each other.
Dehiscence, 95.
Deliquescent panicle, 79.
Dentate, having sharp teeth with concave edges.
Diadelphious, 81.
Dichlamydeous, 70.
Dichotomous, having the divisions always in pairs.
Diclesium, 100.
Diclinate, 82.
Dicotyledons, plants whose seeds have two cotyledons.
Didymus, growing in pairs, 82.
Didynamous, 82.
Diffuse, spreading widely.
Digitate, having five narrow lobes, spreading from a common point.
Diplotegia, 100.
Dissepiments, 88.
Disk, the support of the flower.
Disk florets, 77.
Distichous, arranged in two rows, the one opposite the other.
Divaricate, irregularly branched, with the branches nearly at right angles with the stem.
Dotted ducts, 25.
Drupaceous, resembling a drupe.
Drupe, 96.
Duration, of vegetables, 118.

E.

Echinate, furnished with numerous rigid hairs or straight prickles.
Elementary organs, 14.
Emarginate, having a notch at the end.
Embryo, 102.
Endocarp, 94.
Endogens, 42.
Endopleura, 102.
Endorhizæ, 103.
Endosmose, when a fluid passes thro' a membrane, from without inward.
Endostome, 92.
Ensiform, sword shaped.
Entire, having no marginal divisions.
Epicarp, 94.
Epigynous, 81.
Equitant, 54.
Erect, pointing towards the zenith, 93.
Erose, having the margin irregularly toothed, as if gnawed by some animal.
Estivation, the manner in which the floral envelops are folded up before expansion.
Etærio, 97.
Exintine, 85.
Exogens, 38.
Exorhizæ, 103.
Exosmose, when a fluid passes through a membrane outwards from within.
Exostome, 92.
Exserted, when the stamens are longer than the corolla, 81.
Extine, 84.
Extrorse, turned away from the axis, 83.

F.

Falcate, plain and curved, with parallel edges like the blade of a sickle.
Fan-shaped, plaited like the rays of a fan.
Farinaceous, mealy, having the texture of flour in a mass.
Fascicle, 78.
Fasciculate, growing in tufts.
Fastigiate, when branches are nearly parallel, and nearly perpendicular.
Favose, honey-comb like.
Feather-veined, 61.
Ferruginous, rusty, light brown, with a mixture of red.
Fertilization, 119.
Fibre, 15.
Fiddle-shaped, (see panduriform.)
Filament, 80 and 82.
Filiform, thread-like.
Fimbriate, fringed, by long filiform processes.
Fistulous, a hollow stem.
Flabelliform, (see fan-shaped.)
Flexuous having a gently bending direction, alternately inwards and outwards.
Floating, lying upon the surface of water.

Floral envelops, 70.
Florets, 77.
Foliaceous, leaf-like.
Foliation, the manner in which the young leaves are arranged in the leaf bud. 53.
Follicle, or foliculus, 97.
Food of plants, 130.
Foramen, 92.
Fovilla, 85.
Fringed, (see fimbriate.)
Fruit, 93.
Fruiting, 125.
Fugaceous, falling off, or perishing very quickly.
Functions of roots and leaves, 106.
Funiculus, 91.
Funnel-shaped, any organ in which the tube is ob-conical so that it resembles a funnel.
Furcate, forked, having long terminal lobes.
Furrowed, marked by longitudinal channels.
Fusiform, 47.

G.

Galea, when the upper lip of a bilabiate corolla is arched.
Gamosepalous, 71.
Gamopetalous, 71.
Gelatinous, resembling jelly.
Gemmule, 84.
Geniculate, bent abruptly.
Germ, 86.
Germination, 127.
Gibbous, very convex, or tumid.
Glabrous, smooth, without hairs.
Glandular, bearing glands.
Glandular hairs, 34.
Glans, 99.
Glaucous, covered with a fine bloom of the color of a cabbage leaf.
Globose, nearly a sphere.
Glomerule, 78.
Glumaceæ, a sub class of Endogens, whose floral envelops are glumaceous.
Glumaceous, chaffy.
Glume, 76.
Glutinous, viscid, covered with a viscid exudation.
Granular, divided into little knobs or knotts.
Grumous, in the form of little clustered grains.
Gynobase, 91.
Gynophore, 91.

H.

Halbert-shaped, (see hastate.)
Hairs, 34.
Hairy, (see pilose.)
Hastate, abruptly enlarged at the base into two acute diverging lobes.
Heat, 150.
Heart-shaped, (see cordate.)
Heart-wood, 41.
Herbaceous, soft, green and cellular.
Hesperidium, 99.
Heterogamous, 77.
Hilum, 91-102.
Hirsute, covered with rough hairs.
Hispid, similar to hirsute.
Hoary, covered with short dense hairs, giving an appearance of whiteness to the surface.
Homogamous, 77.
Hooded, (see cucullate.)
Hypocrateriform, a calyx or corolla of which the tube is long and slender, and the limb flat.
Hypogynous, 81.

I.

Imbricate, when the organs overlap each other, like the tiles of a roof.
Included, stamens shorter than the corolla, 81.
Incumbent, when cotyledons are folded with their back to the radicle.
Incurved, bent inwards.
Indehiscent, not opening, 95.
Inflated, swollen.
Inflexed, same as incurved.
Inflorescence, 76.
" Determinate, 77.
" Indeterminate, 78.
Infundibuliform, 72.
Innate, adhering to the apex of a thing, 83.
Integuments of the seed, 101.
Intercellular passages, 32.
Internode, the space between two nodes.
Intexine, 85.
Intine, 85.
Introrse, 30, turned inwards, towards the axis to which it appertains.
Involucel, a partial involucre, the organ that surrounds the partial umbel.
Involucre, 76.
Involute, 54.
Irregular, where the symmetry is destroyed by inequality of parts.
Irritability, 140.

J.

Jointed, having joints, articulated.

K.

Keel, 74.
Keeled, formed in the manner of the keel of a boat, with a sharp projecting ridge.

Kidney shaped, see Reniform.

L.

Labellum, a lip.
Labiate, 72.
Lacerate, divided by deep taper pointed incisions.
Lacunose, having large deep depressions.
Lamella, 74.
Lamina, 72.
Lanceolate, 61.
Latex, 30—138.
Leaf, 54.
Leaf buds, 50.
Legumen, 97.
Lenticels, 35.
Liber, 36
Light, 147
Ligneous, woody, having the texture of wood.
Ligulæ, 75
Ligulate, strap-like.
Limb, the spreading part of a calyx or corolla, 72
Linear, narrow, with the two opposite margins parallel.
Lobed, divided into segments.
Loculicidal, 95
Locusta, spikelets.
Lomentum, 97
Lunate, crescent shaped.
Lyrate, when the divisions of a pinnatifid leaf are unequal.

M.

Marcescent, not falling off, but withering on the organ that supports it.
Medullary sheath, 39
" *processes*, 39
Membranaceous, thin, and semi-transparent.
Membrane, 15
Mesocarp, (see sarcocarp)
Mesophyllum, the cellular tissue of leaves.
Micropyle, the foramen of the seed at maturity.
Midrib, 54
Monochlamydeous, 70.
Monodelphous, 81
Moniliform, necklace shaped.
Monocarpous, bearing fruit but once.
Monocotyledons, those plants whose seeds have but one cotyledon.
Monopetalous, 71
Monophyllous, composed of one leaf
Mucronate, abruptly terminated by a hard sharp point.
Mucous, 16
Multifid, split into numerous segments
Muricate, furnished with numerous short, hard excrescences

N.

Naked, (see glabrous)
Nipaform, 47
Neck, 102
Nectary, 74
Nectarotheca, 74
Needle shaped, (see Acicular)
Nerved, having several ribs
Net'ed, (see reticulated)
Nodding, inclining from a perpendicular, so that the apex is directed downwards
Node, 44
Nodules, 42
Nucleus, 91
Nuculaninm 99

O.

Obcordate, when the tapering end of a cordate leaf is towards the stem
Oblique, inclined to one side
Oblong, 61
Obovate, when the tapering end of a leaf is towards the stem
Obtuse, blunt
Ochrea, 69
Ochre color, yellow, changing to brown
Ochroleucus, light ochre color
Odors, 144
Orbicular, perfectly circular
Orbicularis, 75
Organic mucus, 16
Organs, 32
Origin of wood, 116
Orthotropous, 92
Oval, eliptical
Ovary, 87
Ovate, egg-shaped
Ovule, 91

P.

Paleaceous, chaffy
Paleæ, 75 and 76
Palmate, having five lobes, the midribs of which meet in a common point, in appearance like a hand
Panduriform, fiddle-shaped, an obovate leaf, with a deep recess on each side
Panicle, 79
" deliquiscent, 79
Papillionaceous, 71
Pappus (see egret 75)
Paracorolla, 74
Parastemon, 74
Parenchyma, 17
Parietal, attached to the side
Passages, intercellular, 32
Patens, spreading

Pectinate, comb-shaped, with the segments very numerous, close and narrow like the teeth of a comb.
Pedate, the same as palmate, except the two lateral lobes are divided.
Pedicels, 80
Peduncle, 80
Peltate 62
Penicillate, or *pencillate*, resembling the painter's pencil, as the summit of the style of some Compositae
Pendulous, hanging, 93
Pepo, 100
Perennial, lasting several years
Perfoliate, stem passing through the leaf
Perianth, 70
Pericarp, 94
Perigynous, 81
Perisperm, covering of the seed
Permanent, remaining
Persistent, not falling off
Personnate, 72
Petal, 71
Petaloid, like a petal
Petaloideæ, Endogenous plants, having a perianth like petal
Petiole, 68
Phyllodium, 67
Pilose, hairy
Pinnate, 65
Pinnatifid, with deep, regular, marginal incisions
Pistils, 86
Pitcher-shaped, (see urceolate)
Pith, 41
Pitted, having numerous small, shallow depressions
Placenta, 87
Plaited, folded lengthwise, like the plaits of a folded fan
Plumose, consisting of long hairs, which are themselves hairy.
Plumula, 102
Pollen, 80 and 84
" grains 84
" masses, 125
" tubes, 121
Polycarpous, bearing fruit many times
Polydelphous, 81
Polypetalous, 71
Polyphore, 91
Polysepalous, 71
Pomum, 100
Premorse, the same as Truncate, except the termination is ragged and irregular.
Prickles, 35
Primine, 92
Procumbent, spread over the surface of the ground
Prosenchyma, 17
Prostrate, lying flat upon the ground
Pubescent, downy, covered with short, weak, dense hairs
Pulverulent, powdery, covered with a fine bloom
Punctate, dotted
Putamen, 94
Pyxidium, 98

Q.

Quartine, 92
Quinnate, five leaved
Quintine, 92

R.

Raceme, 79
Racemose, like a raceme
Rachis, 76 and 80
Radiate, diverging from a center, as the ligulate florets of a compound flower.
Radical, arising from the root.
Radicle, 102–103
Radii, 78
Raphe, 93.
Ray florets, 77.
Receptacle, 80 and 91.
Reclinate, bent down upon the stalk.
Recurved, suddenly bent backwards.
Reflexed, same as recurved.
Regma, 98.
Reniform, resembling the figure of a kidney.
Repand, having an uneven, slightly sinuous margin.
Replum, 96.
Respiration, 111.
Resupinate, inverted in position by a twisting of the stalk.
Reticulate, netted, covered with lines which intersect each other.
Retrorse, turned backwards,
Retuse, terminating in a round end.
Revolute, rolled backwards.
Rhizoma, 48.
Rhomboid, oval, a little angular in the middle.
Ringent, (see personate.)
Rosaceous, 72.
Rostrum, 75.
Rotate, 71.
Root, 45.
Root stalk, 48.
Rufous, reddish brown.
Rugose, covered with reticulated lines, the spaces between which are convex.
Ruminated. 104.
Ruptured, 95.

S.

Sagittate, 64.
Salver-shaped, 72, same as hypocrateriform.

Samara, 98.
Sap, 130.
Sapwood, 41.
Sarcocarp, 94.
Sarcodermis, 102.
Scabrous, rough.
Scape, 80.
Scarious, having a thin, dry, shriveled appearance.
Scurf, 35
Scutelliform, broad oval and thick.
Scutum, 75.
Secundine, 92.
Seed, 101.
Semi-anatropous, 93.
Sepals, the separate leaves of the calyx.
Septicidal, 95.
Septifragæ, 95.
Serrate, like the teeth of a saw.
Sessile, without a support.
Setæ, 96
Silicula, 98.
Siliqua, 98.
Sinuate, having the margin uneven.
Slashed, divided by deep, taper-pointed divisions, the same as laciniate.
Sorosis, 101.
Spadix, 79
Spathe, 75.
Spatulate, oblong, with the lower end very much attenuated.
Spermatic animalcules, 85.
Sphaleracarpum, 101.
Spheroidal, nearly spherical.
Spike, 78.
Spikelet, a subdivision of the spike of a grass.
Spongiole, 49.
Spur, 75.
Squamæ, 75.
Squamose, scaly, covered with minute scales, 75.
Squamulæ, 76.
Squarrose, spreading at right angles from the common axis.
Stamens, 80
" arrangement of, 80
" number of, 81
" situation of, 81
" union of, 81.
Stellate, the form of a star,
Stem, 38.
Stigma, 86.
Stings, 34.
Stipe, an additional support of any organ.
Stipitate, supported by stipes.
Stipules, 69.
Stomates, 33.
Striate, marked by longitudinal lines.
Strigose, covered with sharp, appressed, rigid hairs.
Strobilus, 101
Style, 86 and 87
Suberose, corky.
Submersed, under water.
Subulate, in the shape of an awl.
Succulent, cellular and juicy.
Sulcate, marked by longitudinal channels.
Supra-axillary, proceeding from above the axil.
Supra-decompound, 65
Suspended, 93
Sutural dehiscence, 95
Suture, the mark on the pericarp where the parts that compose it seemed to be joined.
Sword-shaped, (see falcate.)
Syconus, 101
Syncarpi, 97
Syncarpium, 97
Syncarpous, 89

T.

Tap root, 47
Tendril, 70
Tercine, 92
Terete, round.
Terminal, at the extremity of a branch.
Ternate, by threes.
Testa, 102
Tetradynamous, 82
Thalamiflorae, plants with the stamens inserted on the torus.
Throat, 71
Thyrse, or *thyrsus*, 79
Tissues, 16
Tomentose, covered with dense, rather rigid, short hairs.
Toothed, (see dentate.)
Torus, 91
Tracheæ, 28
Tracenchyma, 15
Transverse dehiscence 95.
Triadelphous, stamens united in three parcels
Trichotomous, having the divisions all by threes.
Trifid, three cleft.
Trifoliate, three leaved.
Trigonus, three cornered.
Trilobate, three lobed.
Triquetrous, having three acute angles.
Triternate, when the common petiole divides into three secondary petioles, which are each divided into three tertiary petioles, each bearing three leaflets.
Trumpet-shaped, hollow and dilated at one extremity.

Truncate, terminating very abruptly, as if cut off.
Tryma, 99
Tuber, 49
Tubercled, covered with little excrescences or warts.
Tubular, approaching a cylindrical figure and hollow.
Turbinate, inversely conical.
Turgid, swollen.
Turions, the scaly shoots that arise from the neck of perennial plants.
Twining, twisting round some other body.

U.

Umbel, 77
" universal, 77
" partial, 77.
Uncinate, hooked, curved suddenly back at the point.
Undulate, waving.
Unguiculate, 72
Unguis, 72.
Urceolate, 72
Urtriculus, 96.

V.

Valvate, when the sepals or petals fit by their edges, not overlapping each other.
Vascular system, 27
Veins, 58.
Velvety, covered with dense soft tomentum, so that the surface resembles velvet.
Venation, the manner in which the veins run.
Ventral, the projecting part of a pericarp.
Ventricose, swelling unequally on one side.
Vernation, 53
Verrucose, (see tubercled.)
Versatile, 83
Vertical, perpendicular.
Verticillate, whorled, when several things are in opposition around a common axis.
Vexillum, 74
Villose, shaggy, covered with long weak hairs.
Virgate, slender.
Viscid, covered with a glutinous exudation.
Vitellus, a sack in which the embryo is enclosed.
Voluble, twining.

W.

Water, 155
Wedge-shaped, (see cuneate.)
Wheel-shaped, (see rotate.)
Whorled, (see verticillate.)
Wings, 74
Winged, having a thin, broad margin.
Wood, origin of, 116.
Woolly, covered with long, dense, curled hairs.

GRIFFIN'S SERIES OF

SOUTHERN SCHOOL BOOKS.

The Publisher would call the attention of the Southern public to his Series of Southern School Books.

Our teachers are now very generally impressed with the necessity of having a series of School Books of our own, that shall harmonize with our political and domestic institutions, and give a proper tone to the moral and religious character of our youth. At present there is scarcely a school reading book published at the North that does not contain sentiments in a greater or less degree inimical to our interests; and we cannot expect it to be otherwise, so long as we remain dependent on the Northern presses for *every* book made use of in our Schools, Academies and Colleges. It is presumed that the series now offered will render further dependence unnecessary.

The recommendations from Teachers, and other gentlemen of high standing who have examined the series, are sufficient to stamp their character as deserving of peculiar merit.

NOTICES OF THE SERIES.

Macon, Ga., March 10, 1840.

Sir.—Having examined with attention two of the works included in your "Series of Southern Class Books," I feel bound in duty to thank you for the pleasure which I received in the perusal of them.

As the "Southern First Class Book" has secured, already, a large measure of public favor, it might be superfluous to add my commendation of its excellence. But, as the "*Southern Second Class Book*" has appeared more recently, it is entitled to the fostering care of all who feel an interest in the cause of Southern Education. Let Parents read it for themselves, and they will not hesitate to buy, and place it in the hands of their children—in the full persuasion that it will *please, and do them good.*

The remembrance of such a book will be gratifying through every season of life—and its salutary influence must be felt, in connexion with the character, and happiness of "children's children."

S. G. BRAGG,
Rector of Christ Church, Macon.

Mr. Benjamin F. Griffin.

From an attentive examination of the "Southern First Class Book," I feel fully authorized to assert that it is a work presenting no ordinary claims to public encouragement, and that too much praise cannot be bestowed upon the talented compiler, for the successful execution of a task which has long been regarded as a desideratum in the schools of the South.

THOMAS R. LAMAR, M. D.

From the Augusta Constitutionalist.

It is with pleasure we have to announce that a new edition of the "Southern First Class Book, by M. M. Mason, A. M., Principal of the Vineville Academy," has been printed, and can be had at our book stores. It is a work which has been highly recommended by many of our literary and respectable citizens, as the best school book ever presented to teachers in the South. We have hastily looked over its contents, and we find that its contents consist principally of selections from American authors of distinguished character. Together with this volume may be had "The Southern Second and Third Class Books," both compiled by Mrs. S. L. Griffin, and both will calculated, with the first, to accomplish the objects for which they have been printed and published.

Milledgeville, December 20, 1836.

DEAR SIR:—Having examined your compilation under the title of "The Southern First Class Book," it gives us great pleasure in expressing our entire approbation of its matter, form and object; and we cheerfully recommend its speedy adoption in all our schools and academies.

Receive, sir, our united and ardent wish for your entire success, in every effort to advance the interest of general education.

Respectfully your obedient servants,

J. H. STEELE, Esqr., *Putnam County.*
J. BRANHAM, " "
Col. HAZARD, *Glynn,*
N. B. POWELL, *Talbot,*
M. HALL M'ALLISTER, *Chatham,*
M. MYERS.
SAMUEL SPENCER, *Liberty,*
HENRY LOCKHART, *Warren,*
J. B. LAMAR, *Bibb,*
GEO W. CRAWFORD, *Richmond,*
HOWELL COBB, Sol. Gen. W. C. G.

I have introduced "The Southern First Class Book" into our Institution, and its use more than confirms me in the high opinion I before entertained of its merits. It is the book we have long needed, containing sentiments calculated to advance the principles of virtue, religion and patriotism.

J. DARBY, A. M.,
Principal of the Sigourney Institute.

Marshalville, Twiggs Co., Oct. 10, 1839.

DEAR SIR:—I have the pleasure to inform you that the "Southern First Class Book" has been introduced into my School, and its merits duly appreciated by its patrons. We consider it far preferable to any compilation of the kind, and recommend it to the patronage of the public.

WM. LEWIS, Rector.

Augusta, 21st April, 1840.

SIR:—Within a few days past I have examined a series of Books, published by you, entitled "The First, Second and Third Class Book," and am gratified to find that it is what its title purports it to be, a "*Southern*" compilation.—By *Southern*, I do not mean *sectional*, but equally suited to the South, with other parts of the United States. In point of matter, it is candidly believed it will not suffer by a comparison with any similar selection in the language. It is true, many excellent publications of a similar nature, have, within the last few years, made their appearance before the American public, in rapid succession. Indeed, so many, so excellent, and in such rapid succession, that it would be a difficult task to fix a standard of merit, by which to determine the precedence. There is one point, however, which should not be passed by unnoticed, in drawing a comparison between it and other similar compilations, in which it is believed to possess a decided advantage.

In other similar selections, those pieces which related to the manners, customs, and institutions of the South, have either been avoided altogether, or else such have been selected as were blindly filled with reproachful remarks, with ridicule or abuse, in relation to these subjects. The "Southern Class Books," on the contrary, being compiled in the midst of Southern Scenes, by a Southern compiler, is enabled to present a picture which is familiar to the mind of every Southern child, and thus, by meeting many things, he is enabled to realize, be the more able to appreciate, and consequently to relish the whole. Many other, perhaps equally important considerations, might be adduced, to recommend the series to the patronage of the public, but they are all, doubtless, sufficiently prominent to attract that attention which their merit so justly claims. Yours, respectfully,

CYRUS PIKE,
Of the Ellis Street Elementary Academy.

Mr. B. F. Griffin.

Macon, October 10, 1839.

We cheerfully recommend the "Southern First Class Book," as well adapted to the purposes contemplated by the compiler. Such a work has been needed in juvenile instruction—a work judicious in its selections, moral in its sentiments, national in its subjects, and conveniently arranged in its divisions for reading lessons. Its adoption by teachers throughout the country we regard as desirable, not only because of its intrinsic merits, its fitness for the end designed, but as an act of justice, a patronage due to the generous zeal, the home-bred feelings of the proprietor and publisher. Southern people ought to support Southern manufacture, or cease their complaints of dependence.

GEORGE F. PIERCE, Pres't.
WM. H. ELLISON, Prof.
THOMAS B. SLADE.
Georgia Female College.

Greensborough, Ga. July 2, 1840

Mr. Griffin—Sir: I am happy to say, that after a careful examination of the "Series of Southern School Books," I feel no hesitation in saying that I consider them equal, and in some respects superior to any series of reading books now in use. The selections are judiciously arranged, and combine in an eminent degree, that which instructs, and at the same time improves and elevates the mind. I shall take pleasure in introducing the series into my school, as soon as circumstances will permit.

Very respectfully,
A. P. HAMILTON,
Principal of Greensboro' F. Seminary.

From the Augusta (Ga.) Mirror.

Southern School Books.—"The Southern Second and Third Class Books," by Mrs. Sarah L. Griffin, have been placed on our table. From an attentive examination of the arrangement and contents of these volumes, we have no hesitancy in recommending them to the use of Southern schools. The selections are mainly from Southern writers, and beside being free from sentiments inimical to our domestic institutions—which are of late frequently introduced into school books of northern origin—are of a character adapted to the capacities of youths usually embraced in the respective classes for which they are designed. That the people of the South, with interests and institutions so dissimilar to those of the North—at a time, too, when every influence, moral and political, is exerting for the destruction of her dearest right—should not see the madness of her continued dependence upon that section of the country for the means of mental culture, is truly astonishing.—That we should feel and talk as we do on this subject—hold commercial conventions and threaten non intercourse, and at the same time continue in a more abject state of dependence upon the North, than that of the colonies of old upon the mother country, is indeed ridiculous. Is it asked why is this so? The answer is plain. The great leaders of party, those teachers of political ethics, the speech-makers of the day, have altogether overlooked and neglected the great superstructure of all correct national or moral sentiment. While they have fermented and excited the public mind upon the subject of tariffs and sub-treasuries, bauling with the pecuniary interests and political prejudices of the *legal voters*, they have left the youth of the country to imbibe all their impressions and sentiments from foreign sources, and to grow up, if not in indifference for their home and State, at least with a preponderating reverence and respect for the sources from whence they received their first and most lasting impressions. We are brought up Northern boys to become Southern men. Hence our imbecility, and our humiliating dependence. The publisher of the series of Southern School Books before us, has begun at the right place; and from the pure patriotism and sound morality inculcated in his volumes, truly gratifying results may be anticipated. We are glad to learn that the First Class Book, which has been before the public only about eighteen months, has passed through three editions. We hope to see Mr. Griffin's school books universally adopted by Southern teachers.

DEAR SIR :—I have examined, with much satisfaction, the series of "Reading Books," published by you. Highly approving of your experiment, I hope the South will fully sustain it. Concerning the works themselves, I cannot better express my views, than by saying that I expect to introduce them into the institution over which I preside.

I am, respectfully yours, C. F. STURGIS,
Principal of the Lancasterian Institute, Augusta, Ga.

April 9th, 1840.

From an attentive perusal of "The Southern First Class Book," I do not hesitate to pronounce it, in my humble opinion, a work of sterling merit.—It is a judicious and well arranged compilation, and would, I think, be an acquisition to our schools, in improving pupils in the art of correct reading.—"The Third and second Class Books" are excellent—I admire them much.

The above works I shall introduce into my school, as soon as I can conveniently do so. JAS. R. BOLLOUGH,
Preceptor, Savannah, Ga.

From an examination of the "Southern First Class Book," I am favorably impressed with its merits. The selections seem to have been made with care and judgment. Many of the pieces are from the pens of our best Southern writers, and possess very great merit. Such a book has been much needed in our schools and academies, and will, no doubt, be at once introduced by every judicious teacher who becomes acquainted with its value as a school book. B. B. HOPKINS.
Principal of the Female Select School, Macon.

Milledgeville, Dec. 1, 1837.

DEAR SIR.—It affords me great satisfaction in recommending your "Southern First Class Book" to the public. During its progress of preparation, I was not ignorant of the inconvenience and labor to which you were subjected in acquiring the means of making such selections as your judgment approved. I consider it not only well adapted to the use of common schools, but would well repay all for its perusal. I congratulate you on the close of your arduous labors, and trust that a liberal public will repay services so diligently bestowed, as well as talents so usefully employed.
HENRY G. LAMAR.

I have examined the "Southern First Class Book," and do cheerfully recommend it as well adapted for a reading book, especially for the higher classes. The selection is judicious, and well arranged. One great excellence of the work is, that most of the pieces are from the pens of our own citizens—of recent date, and relating to things and events of our own country—rendering the work much more interesting, and better calculated to excite a good moral influence on the minds of our youth.
JAMES WELLS.

My opinion with respect to the "Southern First Class Book" coincides with that expressed by Mr. Wells; and I very cordially recommend its speedy introduction into our Schools and Academies.
DELOS PALMER,
Principal of the Marion Academy.

From the Macon Telegraph, Dec. 18, 1837.

We are indebted to the author for a copy of the "Southern First Class Book, or exercises in Reading and Declamation, by M. M Mason," which as its title imports, is designed particularly for Southern schools and academies. Most of the books now in use are procured from the North, and are tinctured with abolition, and other heresies obnoxious to Southern feelings, and should be discountenanced. We hope, therefore, that the work will be introduced into our schools without delay.

I have examined "The Southern First, Second and Third Class Books" and regard them as well adapted to the purposes for which they are designed. I have no doubt that these books will be duly appreciated, and that at no distant period, they will be generally introduced in the schools of the South.

W. ERNENPUTSCH,
Rector, Richmond Academy.

DEAR SIR:—I have examined, with some care, the "Southern First Class Book," and cheerfully accord to it my hearty approval. Designed for the first classes in our schools and academies, it affords quite a variety of judiciously selected lessons, adapted to reading, recitation and declamation. I find in your selections nothing to offend the taste or the scholar, or to weaken the strength of moral and religious principle; on the contrary, these are studiously strengthened. Your book should be acceptable, particularly to the Southern public, in as much as it contains short extracts from speeches and writings of many of our own distinguished men—all breathing sentiments in harmony with Southern principles and Southern institutions. It affords ample testimony that Southern genius, when directed to the walks of literature, is capable of the highest distinction.

Respectfully, your friend,
To Rev. M. M. Mason. E. A. NISBET.

My views correspond with those expressed by Eugenius A. Nisbet, Esqr.

JAMES C. PATTERSON,
Principal of the Gwinnett Institute.

Macon, Dec. 15, 1837

DEAR SIR:—I approve of your book, first, *as a man*—it is to instruct youth. I approve of it, as once a teacher myself—it is absolutely needed. I approve of it so far as I am a scholar—the matter is well selected and is truly literary. I approve of it as a citizen—it is thrice *native*—its matter is much of it native—its design is native—its publication native. And I approve of it as a Christian teacher—it co-operates with the good in doing good.

Rev. M. Mason SAMUEL J. CASSELS,
Pastor of the Presbyterian Church, Macon.

From the Macon Messenger, Dec. 14, 1837.

The pieces are moral and well written: and we think it high time that our youths should have the writings of Southern American authors placed before them, instead of being confined, as heretofore, almost exclusively to those of Great Britain and the Northern States. We have too justly proved the truism, that "A prophet is not without honor, save in his own country," by our neglect of our own authors; but in the *present* posture of affairs, it should be self-evident to the most careless and unthinking, that our children should be particularly conversant with the writers of our own section of country, whose views, and feelings, and sentiments must of course be governed by our *domestic* and political relations.

In his efforts to promote this object, we most sincerely wish Mr. Mason the success of which we think him deserving.

From the Augusta Chronicle & Sentinel, Dec. 20, 1839.

"The Southern First Class Book," a new work, designed for the use of Schools and Academies in the South and West, a copy of which has been laid on our table, by the publisher, comes to us with such strong recommendations, that we cannot doubt its high value. We have glanced through it, and take pleasure in adding our testimony to that of many others already given, that it deserves, in an eminent degree, the patronage of the public of the South. We hope that the instructors of youth will introduce it into immediate use in their seminaries of learning. It is by Mr. M. M. Mason, Principal of the Vineville Academy, at Macon, Georgia.

From the Southern Ladies' Book, January, 1840.

From our peculiar social and political relations, we must ever be at variance with the source from whence has heretofore proceeded all our school books; and not only this, but nearly all our literature, which has been more or less tinged with feelings and sentiments contrary to our own, and in their tendency, destructive to those rights which we hold most dear. But we will not enlarge upon this topic, satisfied that the reason for encouraging the dissemination of works of this kind is well understood by every Southerner. The work is classified by reading lessons, consisting of prose and poetry, chiefly from the pens of Southern writers; but there are many other selections which come from distinguished authors whose name and fame belongs to the world at large. We understand that a series of works, of a similar character, is in preparation for publication. It is to be hoped that they will be characterized by the same taste and judgment, in the selections, as is manifest in the work before us.

From the Tallahassee Star, Feb. 14, 1840.

We have received copies of the Southern First and Second Class Books, in two separate volumes,; the former, by M. M. Mason, adapted to the higher, and the latter, by Mrs. SARAH L. GRIFEIN, designed for the middle class in the schools of the Southern and Western States.

Upon examination of these books, we view them as containing articles of composition far better adapted to the taste and genius of Southern children, than any other class books extant, which have come to our notice. The pieces are extracted from the writings and speeches of Southern gentlemen, and contain such sentiments and principles as we hold essential to be inculcated in the present rising generation. We heartily recommend the books to the attention of teachers, parents, and guardians of youth.

I have carefully examined the "Southern First Class Book," and feel no hesitation in saying that I consider it a work of a very superior character—indeed, I am so well pleased with it, that I shall introduce it into my school without delay.

CHARLES DEAN,
Principal Etowah Academy.

Having long desired to see an elementary Class Book issue from a Southern press, unobjectionable in its selections, and adapted to the wants of our youthful readers, we greet the volume which you have just issued, believing it to be both a safe and suitable book for Southern schools and academies.

A. MEANS, M. D.
G. W. LANE,
Georgia Conference Manual Labor School.

I have examined the "Southern First Class Book," by M. M. Mason, and think the selections very judicious, both in prose and poetry. From the high estimation I place upon it, I have adopted it in my school as a principal reading book, and take pleasure in recommending it to public patronage, as an excellent book for the improvement of youth.

B. F. PRICE,
Principal Farmer's Academy, Houston.

I fully concur with Mr. Price, and hope the day is not distant when our own press will be able to furnish our own schools with elementary books like the present, of a character suited to our wants

H. B. HATHAWAY.

SIR—Your "Southern Class Book," I regard as a most valuable accession to the book now used in our schools. That your compilation may immediately supecede all similar ones which are not congenial with our institutions, whether civil or religious, is the ardent wish of

Your obedient servant,
PETER MACINTYRE,
Rev. M. M. Mason. Principal of the Macon Academy.

SIR—I have examined your late publication, the "Southern First Class Book," and find it a judicious and well arranged compilation, admirably adapted to Southern schools. It is a work that has been much needed at the South, and I have no doubt that its circulation will be rapid and extensive.

J. O'KIEFFE,
Principal of the Plumb Street Seminary, Macon.

From the Augusta Constitutionalist, Dec. 21, 1839.

"The Southern First Class Book," is the title of a new work we have just received from the publisher, M. M. Mason, A. M., Principal of the Vineville Academy. It is well spoken of and highly recommended, by a number of our most distinguished citizens, and from the little we have seen and read of it, we are led to the belief that it is just such a compilation as is needed in our different Schools. The work is handsomely got up, and printed on good paper.

From the Savannah Georgian, Dec. 31, 1840.

But the other day the frequent inquiry was made, "Who reads an American book?" It will soon be asked, who does not? Our Irving has established the literary fame of his country in every land, for more than one species of composition, while the pulpit, the bar, and the Halls of the National and State Legislature evince in bold relief the fact, that the School master has been abroad in our happy land. The Notts, the Wirts, the Jeffersons, the Madisons, the Wides, the Grimkes, and other bright names in their peculiar walks, are inscribed, not on the annals of one State alone, but shine on the tablets of their country's history. The Statesman, and his pulpit eulogist, the scholar, and the barrister, the philanthropist and the poet, all contribute in their respective spheres, to elevate the moral tone of a nation's principles: and it is pleasant to behold their eloquent minds pressed as instruments in the great work of training the aspirations of youth in that path, which, when followed without deviation, leads to the lofty temple of science.

The volume before us is the first of a series of Southern School Books, published by Mr. BENJAMIN F. GRIFFIN, of Macon, in this State, and has been before the public about two years. In that period it has passed through three editions, and now enlarged, it has assumed a permanent form. The compiler of this interesting volume (Rev. M. M. Mason,) has performed well his task, and by his judicious selection, has rendered a service to teachers and their pupils, which will be duly appreciated.

We rejoice to find that his labors are already being rewarded in the estimation placed upon his Southern First Class Book, which, wherever it is known, is winning its way to public favor. We believe that it will not be confined to Southern Schools, but will soon be found in those of the North, for the lucid minds of their orators and poets, essentially contribute to enrich its pages.

Although designed more especially for the atmosphere of the South, a National tone pervades so generally the selections, as to make it acceptable to all sections—for what American youth is there who does not desire an acquaintance with the gifted minds of those American Patriots, who, though removed by distance, still breathe in the language of Washington, the sentiments his character inculcated.

In these pages this fellowship is brought about and encouraged, to be extended as the leisure of an ambitious mind will allow, and the communion thus effected between the young and those who have preceded them, cannot fail to exert a beneficial influence upon the actions of the former, when they arrive at that epoch when they shall be called upon to assume the mantles of their predecessors.

That this work will meet increasing patronage at the South, we cannot for a moment doubt, and it is a source of pride to the Southern reader, that although rich in its selections, there are not a few minds, even in our own State, whose treasures have not been extracted from their caskets, to gild the pages of the present publication. The fact shows the fertile field whence the publisher had to cull his flowers for the advancement in science of the rising generation.

SIR—I congratulate you as the proprietor and publisher of a work so long needed here, as your third edition of "The Southern First Class Book." It is well adapted to the whole design, and will, no doubt, be much preferred in all the schools of the South and West.

GEORGE P. COOPER,
Mr. B. F. Griffin. Rector of Ocmulgee Academy.

Having carefully examined the "Southern First Class Book," it affords me much pleasure to recommend it to public patronage. Its *real merit* could scarcely fail of securing it a most favorable reception. Its particular adaptation to Southern Schools I think an additional reason for its general and speedy adoption. NATHAN LONGFELLOW,
Principal of the Female High School, Scottsboro'.

I have the "Southern First Class Book," by M. M. Mason, in use in my academy, and take pleasure in bearing testimony to its peculiar merits and adaptation to the wants of those institutions for which it is intended.

MILTON WILDER,
Principal of the Jefferson Academy.

Richland, Twiggs Co., Feb. 8, 1840.

DEAR SIR—But a cursory examination of the reading books now used in some of our academies, is requisite, to discover that they contain sentiments inimical to Southern institutions, and therefore unfit to be placed in the hands of those who are shortly to act their parts as citizens of the South. It is important, also, to interest pupils in any branch they pursue. To give them a work whose authors are mostly their acquaintances, and imparting sentiments congenial to their own feelings and principles, will measurably effect this desirable end. The "Southern First Class Book," portraying briefly the genius and sentiments of the South, is admirably adapted to secure these objects.—The introduction of it in my school as the principal reading book, is not only to encourage Southern publications, but from a conviction of its own utility, hoping also that it may shortly supercede every similar work in Southern academies. MILTON E. BACON,
Mr. B. F. Griffin. Rector of the Richland Academy.

Saaannah, Ga. April 11, 1840.

MR. GRIFFIN—I have examined the "Southern First Class Book," which you had the kindness to present me through Mr. Boardman, and I feel a pleasure in saying that I regard it as meriting the most extensive patronage

GEORGE WHITE,
Principal of the Savannah Academy.

Georgia Female Academy, February, 1840.

The Southern Second Class Book is a compilation judiciously selected, and aptly designed to catch the attention—awaken the interest and promote the love of reading among the children for whose benefit it has been prepared. Without making any ostentatious claims to extraordinary merit—to exclusive preference, it is yet entitled on many considerations to circulation and use. We hope the toil of the compiler will meet with its just reward in the general adoption of the work by the Southern schools.

G. F. PIERCE, Pres't.
W. H. ELLISON, Prof.

DEAR SIR—The copy of the Southern Second Class Book you had the goodness to forward to me was duly received, and I have given it a sufficient examination to convince me of its superior merits. It is what our middle classes need; and its compilation, and the dress in which it appears, reflect equal credit on both the compiler and publisher. You have our most hearty wishes for success in your endeavors to furnish our Southern schools with Southern books. J. DARBY, A. M.,
Mr. B. F. Griffin. Principal of the Sigourney Institute.

Griffin's Series of

SOUTHERN SCHOOL BOOKS.

SOUTHERN FIRST CLASS BOOK; OR EXERCISES IN READING AND DECLAMATION: Selected principally from American Authors, and designed for the use of Schools and Academies in the Southern and Western States. By M. M. MASON, A. B.

Having carefully examined the SOUTHERN FIRST CLASS BOOK, it affords me much pleasure to recommend it to public patronage. Its *real merit* could scarcely fail of securing to it a most favorable reception. Its particulnr adaptation to Southern Schools I think an additional reason for its general and speedy adoption. NATHAN LONGFELLOW,

Principal of the Female High School, Scottsboro'.

SOUTHERN SECOND CLASS BOOK; designed for the middle class in the Schools of the Southern and Western States. By Mrs. SARAH L. GRIFFIN.

GEORGIA FEMALE COLLEGE, February 1840.

The SOUTHERN SECOND CLASS BOOK is a compilation judiciously selected, and aptly designed to catch the attention, awaken the interest and promote the love of reading among the children for whose benefit it has been prepared. Without making any ostentatious claims to extraordinary merit—to exclusive preference, it is yet entitled on many considerations to circulation and use. We hope the toil of the compiler will meet with its just reward in the general adoption of the work by the Southern Schools.

GEO. F. PIERCE, Pres't,
M. J. MASON, Prof.

SOUTHERN THIRD CLASS BOOK; designed for the younger classes in the Schools of the Southern and Western States. By Mrs. SARAH L. GRIFFIN.

MACON, Georgia, April 10, 1840.

MR. B. F. GRIFFIN—Whether for the school or nursery, I think the SOUTHERN THIRD CLASS BOOK one of the best little manuals ever printed: and do respectfully recommend it to every Mother and Teacher.

It seems to have been compiled strictly on the philosophical principle in juvenile instruction that "little things are great to little men," and the most important tenets in morals are here found dressed in the simplest garb; in language pure, but well adapted to youthful capacity.

GEORGE P. COOPER.

THE SOUTHERN PRIMARY READER; OR CHILD'S FIRST BOOK: consisting of Progressive Lessons in words of One and Two Syllables. By Mrs. SARAH L. GRIFFIN.

This little work is expressly intended for the Beginner. Not only the Alphabet but the whole book is printed in a very legible type, rendering it perfectly easy for the little learner to distinguish at once the form of the letters.